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# TRANSCRIPT OF RECORD.

## SUPREME COURT OF THE UNITED STATES.

**OCTOBER TERM, 1886.**

No. ~~331~~ 43

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JOHN DOBSON AND JAMES DOBSON, TRADING AS JOHN AND JAMES DOBSON, APPELLANTS,

*vs.*

JAMES LEES, JOSEPH LEES, AND JOHN LEES, TRADING AS JAMES LEES AND SONS.

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APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF PENNSYLVANIA.

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FILED JUNE 10, 1887.

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*vs.*

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1 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit.

JOHN DOBSON and JAMES DOBSON, Trading as John and James Dobson, and JAMES GREAVES
*vs.*
JAMES LEES, JOSEPH LEES, and JOHN LEES, Trading as James Lees and Sons.

UNITED STATES OF AMERICA,
*Eastern District of Pennsylvania,* } *ss:*

Pleas and proceedings before the honorable the judges of the circuit court of the United States in and for the eastern district of Pennsylvania, in the third circuit, of April session, 1882, No. 59.

It is thus contained:

2 Be it remembered that on the twenty-first day of July, in the year of our Lord one thousand eight hundred and eighty-two, John Dobson and James Dobson, trading as John and James Dobson, and James Greaves, by their attorney, George E. Buckley, Esquire, comes into court here and files their bill of complaint against James Lees, Joseph Lees, and John Lees, trading as James Lees and Sons, which is in the words and figures following, to wit:

3 Circuit Court of the United States in and for the Eastern District of Pennsylvania.

JOHN DOBSON and JAMES DOBSON, Trading as John and James Dobson, and JAMES GREAVES
*vs.*
JAMES LEES, JOSEPH LEES, and JOHN LEES, Trading as James Lees and Sons.
} In Equity.

To the honorable the judges of the circuit court of the United States in and for the eastern district of Pennsylvania:

John Dobson and James Dobson, trading as John and James Dobson, and James Greaves, all of Philadelphia, in the State of Pennsylvania, and citizens of said State, bring this bill against James Lees, Joseph Lees, and John Lees, trading as James Lees and Sons, of the same place, and citizens of said State.

4 And thereupon your orators complain and say that heretofore and before the 20th day of February, A. D. 1877, the said James Greaves was the true, original, and first inventor of a certain new and useful improvement in condensing cylinder for carding engines, not known or used before and not in public use or on sale for more than two years prior to his application for a patent therefor.

And your orators further show unto your honors that said Greaves, so being the inventor of said improvement, made application to the

proper department of the Government of the United States for letters patent, in accordance with the then existing acts of Congress, and duly complied in all respects with the conditions and requirements of said acts, and that on the 20th day of February, A. D. 1877, letters patent of the United States, numbered 187,620, signed, sealed, and executed in due form of law, for the said invention or discovery were issued to said James Greaves, whereby there were secured to him, his heirs, executors, administrators, or assigns, for the term of 17 years from the 20th day of February, 1877, the full and exclusive right of making, using, and vending the said invention or discovery throughout the United States and the territories thereof.

5 And your orators further show unto your honors that on or about the 23rd day of April, A. D. 1877, the said James Greaves, by an assignment in writing of that date, sold, assigned, and transferred unto John Dobson one-quarter and unto James Dobson one-quarter of all his right, title, and interest in and to said letters patent and invention, which assignment was duly recorded in the Patent Office of the United States, as by said assignment, or a duly authenticated copy thereof, and the certificate of such recording thereto affixed, ready in court to be produced, will fully and at large appear.

6 And your orators further show unto your honors that they, upon the 24th day of March, A. D. 1877, having for good and lawful cause surrendered said original letters patent No. — to the Commissioner of Patents, and having made due application therefor, and having in all things complied with the acts of Congress in such case made and provided, did, on the 7th day of March, 1882, obtain new letters patent, numbered 10054, for the same invention for the residue of said term of 17 years, which said last-mentioned letters patent were issued in due form of law, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior and countersigned by the Commissioner of Patents, and bearing date the day and year last aforesaid, as by the said last-mentioned letters patent, or a duly authenticated copy thereof, in court to be produced, will appear.

And your orators further show that a specification and drawing of the aforesaid invention or discovery was annexed to and formed a part of the said last-mentioned reissued letters patent, and that the said last-mentioned letters patent and the said specification and drawing thereto annexed (which, or an exemplified copy of which, your orators will produce, as your honors may direct) were duly recorded in the Patent Office.

7 And your orators further show that your orators extensively applied the said invention to practical use, and have been, and but for the infringement hereinafter complained of would still be, in the undisturbed possession, use, and enjoyment of the exclusive privileges secured by the said letters patent and in receipt of the profits of the same.

And your orators further show unto your honors, as they are informed and believe, that the said defendants hereinafter named,

well knowing all the facts hereinbefore set forth, are now making, using, and vending the said patented improvement, or a device in some parts thereof substantially the same in construction and operation as in the said letters patent mentioned, the exclusive right and privilege to make, use, and vend which throughout the United States and the territories thereof is thus by law vested in your orators.

And so it is, may it please your honors, that the said defendants, as your orators are informed and believe, without the license of your orators, against their will, and in violation of their rights, have made, sold, and used, and intend to continue still to make, sell, and use, the said device within the eastern district of Pennsylvania, all of which is in violation of the said letters patent.

To the end, therefore, that the defendants may, if they can, show reason why your orators should not have the relief hereby prayed, and that they may make a full disclosure and discovery of all the matters aforesaid, and upon their several corporal oaths and according to the best and utmost of their knowledge, remembrance, information, and belief full, true, direct, and perfect answer make to such of the several interrogatories hereinafter numbered and set forth as by the note hereunder written they are required to answer—that is to say:

I. Whether the said original letters patent were granted and issued to the said James Greaves.

II. Whether the said reissued letters patent were granted and issued to the said James Greaves and John Dobson and James Dobson, assignees of a part interest therein.

III. Whether the said defendants or either of them, and which, have at any time, and when and during what period of time, made, sold, or used any, and how many, of said improvements in condensing cylinder for carding engines constructed in whole or in part upon the principles and in the manner described in said letters patent, and when and how they were made. Describe minutely and in detail their construction and mode of operation.

8 And now, to the end that the defendants may be compelled to account for and pay over the income thus unlawfully derived from the violation of the rights of your orators as above and be restrained from any further violation of said rights, your orators pray that your honors may grant a writ of injunction restraining the defendants from any further construction or sale or use in any manner of said patented improvements or any part thereof in violation of the rights of your orators as aforesaid, and that the infringeing devices now in possession or use of the said defendants may be destroyed or delivered up to your orators for that purpose, and also that your honors, upon the rendering of the decree for an infringement as above prayed for, may proceed to assess or cause to be assessed under your direction, in addition to the profits to be accounted for by the defendants as aforesaid, the damages your orators have sustained by reason of such infringement, and that your honors may increase the actual damages so assessed to a sum equal to three times the amount of such assessment under the circumstances of

the wilful and unjust infringement by said defendants, as herein set forth; and your orators pray also for a provisional or preliminary injunction, and for such other relief as the equity of the case may require and to your honors may seem meet.

May it please your honors to grant unto your orators not only a writ of injunction conformable to the prayer of this bill, but also a writ of subpœna of the United States of America, directed to the said James Lees, Joseph Lees, and John Lees and commanding them to appear and answer unto this bill of complaint and to abide and perform such order and decree in the premises as to the court shall seem meet and be required by the principles of equity and good conscience.

GEORGE E. BUCKLEY,
*Solicitor and Counsel for Complainants.*

The defendants are required to answer each of the foregoing interrogatories, numbered I to III, inclusive.

GEORGE E. BUCKLEY,
*Solicitor and Counsel for Complainants.*

9 UNITED STATES OF AMERICA,
*Eastern District of Pennsylvania,* } *ss:*

James Greaves, one of the complainants in the foregoing bill named, being duly sworn, says that so far as the statements therein contained are within his own knowledge they are true, and so far as they are derived from the information of others he verily believes them to be true; and he further says that he verily believes himself, in said bill named, to be the original, true, and first inventor of the new and useful improvement which is described in the reissued letters patent granted to the complainants and mentioned in the foregoing bill; and your deponent verily believes that the title of complainants as set forth in said bill is true.

JAMES GREAVES.

Sworn to and subscribed this tenth day of July, A. D. 1882, before me—

WILLIAM C. STOEVER,
[SEAL.] *Notary Public.*

10 (Endorsed:) No. 59, April sess., 1882. U. S. circuit court, eastern district of Penna. John Dobson and James Dobson, trading as John and James Dobson, and James Greaves *vs.* James Lees, Joseph Lees, and John Lees, trading as James Lees and Sons. Bill in equity. Issue subpœna, returnable the first Monday of ——. George E. Buckley, sol'r for complainant-. Filed July 21, 1882.

11 And afterwards, to wit, on the 14th day of October, A. D. 1882, the respondents, by their attorney, Hector T. Fenton, Esq., comes into court here and files their answer in the words and figures following, to wit:

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, Sitting in Equity.

JOHN DOBSON and JAMES DOBSON, Trading as John and James Dobson, and James Greaves
*vs.*
JAMES LEES, JOSEPH LEES, and JOHN S. Lees, Copartners Trading as James Lees & Sons.

No. 59, April Sessions, 1882.

The joint and several answer of James Lees, Joseph Lees, and John S. Lees, trading as James Lees & Sons, defendants, to the bill of complaint of John Dobson and James Dobson, trading as John and James Dobson, and James Greaves, complainants.

These respondents, now and at all times hereafter, saving and reserving to themselves all and all manner of benefit and advantage of exception that can or may be had or taken to the many errors, uncertainties, and other imperfections in the said complain-
12 ants' said bill of complaint contained, for answer thereto or unto so many and such parts thereof as these defendants are advised is or are material or necessary to be answered unto by them, answering, say:

1. These defendants, answering upon information and belief, admit that letters patent of the United States No. 187,620, dated February 20, 1877, for an alleged improvement in condensing cylinders for carding engines, were granted to James Greaves, one of the complainants, as in said bill of complaint alleged and set forth; but defendants have no knowledge and are not informed, except by said bill, of the alleged assignment by said James Greaves of an interest in the said letters patent to the co-complainants, John Dobson and James Dobson, as in said bill averred, or of the title of the said complainants to the alleged reissue of the said original patent, and pray that the complainants may be required to make due proof thereof.

2. And these defendants, further answering, say that they are informed and believe it to to be true, as in said bill alleged, that the said original letters patent were surrendered to the Commissioner of Patents and new letters patent, No. 10,354, division A, dated March 7, 1882, issued to the said complainants; but these defendants are advised and believe, and so charge, that said last-mentioned letters patent were absolutely null and void from their issue, and that the same were improvidently, wrongfully, and illegally granted, inasmuch as said reissued letters patent describe and claim an alleged invention that is distinct from and dissimilar to and not the same as the alleged invention or any part thereof described and claimed in said original letters patent, and that new matter was inter-
13 polated into said reissued letters patent in contravention of law, which said new matter embraced certain important and substantial changes and alterations which had become known and

used by the public, and which were extensively used as public property, and did not belong to or have any part in the alleged invention of the said James Greaves, and which were in express terms rejected by the Commissioner of Patents and withdrawn and disclaimed by the said patentee in his application for said original letters patent in order to obtain the same, and without which withdrawal and disclaimer said original letters patent would not have been granted, issued, or allowed.

3. And these defendants, further answering, say that said original letters patent were surrendered to the Commissioner of Patents on petition filed in the Patent Office of the United States on the fifteenth day of March, 1877, praying for a reissue thereof in two parts on amended specifications, and that in consequence thereof two new and several letters patent were issued to the complainants, one as division B, No. 9477, dated November 23, 1880, and the other as division A, No. 10054, dated March 7, 1882, the latter only of which is mentioned in said bill of complaint; and these respondents are advised and so charge that the said two divisions of said reissue should have been granted and dated and issued, if at all, as of the same date, and that in the grant and issue of said division B, first granted, the power of the Commissioner in the premises was exhausted, and the acceptance of the same by the complainants estopped them from thereafter asking, demanding, or receiving, and the Commissioner of Patents from validly issuing, any other new patent as a reissued division or part of said surrendered original letters
14 patent, which became absolutely void, cancelled, and surrendered by operation of law and in pursuance of the statutes in such case made and provided at the date of and in consequence of the grant and issue of said reissued patent, division B, on the 23d November, 1880, in consequence whereof the subsequent grant and issue by the Commissioner of Patents of said reissued patent, division A, on the seventh day of March, 1882, mentioned in said bill of complaint, was without authority of law, and that the same were therefore irregular and improvidently granted, and were and are null and void.

4. And these respondents, further answering, say that they are advised that the said reissued letters patent in said bill mentioned are invalid and void, for that division B of said reissue, which had been previously granted on the 23d November, 1880, contains in the first claiming clause thereof a claim for substantially the same elements and all of the same devices, and for the same combination and arrangement thereof, and for the same purpose and operating in the same manner, and is for substantially the same alleged invention as that for which said reissued patent in said bill mentioned purports to have been granted and issued, and in consequence thereof said last-mentioned grant was in excess of the authority of the Commissioner and contrary to and in contravention of the statute authorizing the reissue of letters patent.

5. And these respondents, further answering, deny that said original letters patent were surrendered for any good and lawful cause, or that the said two several reissued letters patent describe and claim

separate and distinct parts of the same invention as that for
15 which said original letters patent were issued or intended to secure; and these defendants aver that said original letters patent were not surrendered because of the same being inoperative or invalid by reason of a defective or insufficient specification arising from inadvertence, accident, or mistake without any fraudulent intent on the part of the said patentee; and these defendants further aver that said original letters patents were surrendered and false and fraudulent representations made with intent to omit certain qualifying clauses and to interpolate and claim, in said new and reissued letters patent, and the same do not contain the qualifying clauses aforesaid and do contain interpolations and claims, for more and other matter than was embraced in the alleged invention of said James Greaves for which said original patent was issued to him; and these defendants further allege that said reissued letters patent, division A, in said bill mentioned are not for the same invention or any part thereof for which said letters patent were granted or intended to secure or which was intended to be described and claimed therein and thereby, but that the same were granted for another and different alleged invention, and by reason thereof, as well as for other reasons, the grant of said reissued letters patent by the Commissioner of Patents was without authority of law; wherefore and by reason of the matters aforesaid these defendants are advised that said reissued letters patent No. 10054 were and are invalid and void.

6. And these defendants, further answering, say that they are informed and believe that the said alleged improvement described and claimed in the said reissued letters patent in said bill mentioned or the material and substantial parts of the thing patented was
16 abandoned by the said James Greaves to the public, and had also been for more than two years prior to the application for said original letters patent in public use and on sale in the United States by and with the knowledge and consent of the said James Greaves by reason whereof the said original and reissued letters patent were and are null and void.

7. And these respondents further say, in denial of the relief in said bill prayed, that they are advised and believe that the devices mentioned and described in said reissued letters patent and the material and substantial parts of the thing patented consist merely in changes in the form, proportion, and material of the parts thereof and in their arrangement, the same being old and well known and said changes involving mere mechanical skill and being an obvious mode of producing the result claimed and not involving any invention or discovery or patentability, and also that said reissued letters patent do not describe or claim any patentable improvement or combination within the meaning of the acts of Congress relating thereto; wherefore and for divers other reasons the said original as well as the said reissued letters patent were wrongfully and improvidently granted and were and are void and of no force or effect.

8. And these defendants, further answering, say that they have not violated or infringed any exclusive rights validly secured to the

complainants by said reissued letters patent in said bill mentioned nor made or sold any carding machinery containing the combination of devices described and claimed therein. On the contrary, these defendants are not manufacturers or dealers in machinery, but are engaged in the manufacture of yarns with carding ma-
17 chinery which they purchased in the open market and have had in use for a long time past and in which the devices for condensing the roving differ substantially from the special combination of devices described and claimed in said reissued letters patent.

9. And these respondents, further answering, say that they are informed and believe and so charge that the said James Greaves in said bill named was not the true, original, and first inventor of the alleged improvement or any material or substantial part thereof described and claimed in and by said reissued letters patent therein recited, but that the said alleged improvement or the material and substantial part thereof claimed as new and original were long prior to the alleged invention or discovery thereof by the said James Greaves and prior to his application for said original letters patent well known to and publicly made, used, and sold by divers persons in the United States and elsewhere, and are found described in prior letters patent of the United States and Great Britain and in printed publications published in the United States and elsewhere, and among the persons who so knew of and made, used, and sold the same are Charles Rittenhouse, of the firm of C. Rittenhouse & Sons, residing at Norristown, in the State of Pennsylvania, where such prior use was had by him; also Joseph W. Stone, of North Andover, Mass., who so knew of and made, used, and sold the same at said North Andover and elsewhere; also Barton H. Jenks, Daniel T. Gage, and M. A. Furbush, all now or late residing in the city of Philadelphia, in the State of Pennsylvania, who so knew of and made, used, and sold the same at said city of Philadelphia and elsewhere; also that the same was so made, used, and sold prior
18 to the alleged invention thereof by the said James Greaves and prior to his application for said original letters patent therefor by the Bridesburg Manufacturing Company at its factory, in the said city of Philadelphia.

And among the prior patents and publications in which the same is found described as aforesaid are the following:

Letters patent of the United States to J. Harraday, No. 10986, dated May 30, 1854; also letters patent of the United States to Albin Worth, No. 130,343, dated August 6, 1872; also other letters patent of the United States of same date to said Albin Worth, No. 130,344.

English letters patent No. 2885, dated December 5, 1856, to Davison & Crowther for improvements in machinery for winding yarns, etc.; also English letters patent No. 13027, dated March 26, 1850, to Evan Leigh for improvements in spinning machinery; also English letters patent No. 1247, dated May 18, 1863, to Joseph Beaumont for improvements in condensing machines for working yarns or wool and other fibrous substances.

Without this, that there is any other cause, matter, or thing in said bill contained material or necessary for these defendants to

make answer unto and not herein and hereby well and sufficiently answered, confessed, traversed, and avoided or denied is true, to the knowledge and belief of these defendants; all which matters and things these defendants are and will be ready and willing to aver, maintain, and prove as this honorable court shall direct, and humbly pray to be hence dismissed with their reasonable costs and charges in this behalf most wrongfully sustained.

(Signed) JAMES LEES.
JOHN S. LEES.
JOSEPH LEES.

H. T. FENTON,
*Counsel for Defendants.*

19 U. S. A., *Eastern District of Pennsylvania,* } ss:

John S. Lees, one of the defendants in the foregoing answer named, being duly sworn, deposes and says that the facts and statements therein contained, so far as stated of *their* own knowledge, are true, and so far as stated upon information *they* verily believe the same to be true.

JNO. S. LEES.

Sworn and subscribed before me this 14th day of October. A. D. 1882.

SAMUEL BELL,
*U. S. Com'r.*

(Endorsed:) No. 59, April sess., 1882. U. S. C. C. Dobson *et al.* *vs.* Lees. Equity, No. 59. Answer. Hector T. Fenton, solicitor for defendants. Filed October 14, 1882.

20 C. C. U. S., Eastern Dist. of Penna. In Equity.

JOHN DOBSON and JAMES DOBSON, Trading as John and James Dobson, and James Greaves
*vs.*
JAMES LEES, JOSEPH LEES, and JOHN S. LEES, Trading as James Lees and Sons.
} April Session, 1882, No. 59.

The replication of John Dobson and James Dobson, trading as J. and J. Dobson, and James Greaves, complainants, to the answer of Joseph Lees, James Lees, and John S. Lees, trading as James Lees & Sons, defendants.

These repliants, saving and reserving all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereunto say that they will aver and prove the said bill to be true, certain, and sufficient in the law to be answered unto, and that the said answer of the said defendants is uncertain, untrue, and insufficient to be replied unto by these repliants, with-

out this, any other matter or thing whatsoever in the said answer contained material or effectual in the law to be replied unto, confessed and avoided, traversed or denied, is not true; all which matters and things these repliants are and will be ready to aver and prove as this honorable court shall direct, and humbly pray as in and by the said bill they have already prayed.

GEORGE E. BUCKLEY,
*Counsel for Complainants.*

21 [Endorsed:] C. C. U. S., eastern district of Penna. In equity. No. 59, April sess., 1882. J. — J. Dobson & James Greaves *vs.* James Lees & Sons. Replication.

22 In the United States Circuit Court in and for the Eastern District of Pennsylvania. In Equity.

JOHN DOBSON and JAMES DOBSON, Trading as John & James Dobson, and James Greaves
*vs.*
JAMES LEES, JOSEPH LEES, and JOHN LEES, Trading as James Lees & Sons.
} No. 59, April Sessions, 1882.

*Testimony on Behalf of Complainants.*

Parties met, pursuant to agreement, this Thursday, November 13, A. D. 1882, at the office of Hector T. Fenton, Esq., 905 Walnut street, Philadelphia, Pa., at 1 o'clock p. m.

Present: George E. Buckley, Esq., for complainants, and Hector T. Fenton, Esq., on behalf of defendants.

23 It is stipulated and agreed by the counsel for respective parties, the court consenting, that Francis Shunk Brown, Esq., of 905 Walnut street, in said city, a notary public, shall act as examiner to take the testimony of witnesses in above case.

Complainants offer in evidence the United States reissued patent to James Greaves, dated March 7, 1882, division A, No. 10054, for condensing cylinder for carding machines, original patent dated February 20, 1877, No. 187,620, application for said reissue of which was filed March 24, 1877, in the United States Patent Office.

Defendants concede, with the same effect as if duly proven, that said complainant Greaves assigned to the complainants, John Dobson and James Dobson, each a one-third interest in the said invention during the pendency of the application for the patent and in the said letters patent when granted, which assignment is recorded in United States Patent office.

Defendants further concede, with the same effect as if duly proven, that defendants have had in continuous use since the issue of said reissue No. 10054 at their works, at Bridgeport, Montgomery county, Pennsylvania, a number of machines embodying the invention therein claimed, viz: "In a carding engine, a condensing or rubber cylinder, mounted on a polygonally shaped horizontal shaft, in com-

bination with a driving gear, A, having a sleeve-shaped bearing, B, said shaft and cylinder being adapted to be revolved by the drive-wheel A, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described and set forth" in said reissued letters patent.

Adjourned.

Plaintiffs rest their testimony-in-chief.

24 United States Circuit Court, Eastern District of Pennsylvania.
In Equity.

JOHN DOBSON *et al.*
*vs.*
JAMES LEES *et al.*
} No. 59, April Sessions, 1882.

*Complainants' Rebuttal Testimony.*

Parties met, pursuant to stipulation, this twenty-fifth day of March, A. D. 1887, at the office of George E. Buckley, Esquire, 134 South Ninth street, Philadelphia, Pennsylvania.

Present: George E. Buckley, Esquire, solicitor for complainants; Hector T. Fenton, Esquire, solicitor for defendants.

BARTON H. JENKS being duly sworn as a witness on the part
25 of complainants as a mechanical expert, the counsel for respective parties stipulate and agree that he shall be so considered as though he had been duly proven so to be. It is also thus admitted as fact that such witness has heretofore acted and testified as mechanical expert in numerous patent causes in this and other circuit courts of the United States.

Question 1. What is your name, age, residence, and occupation?

Answer. Barton H. Jenks; fifty-seven; Philadelphia; I have been a practical mechanic for many years, manager of large mechanical manufacturers' establishments, and am now by profession a mechanical engineer and expert; am a graduate of the Pennsylvania University.

Q. 2. What knowledge, if any, have you of textile machinery?

A. I have had a large experience in manufacturing the same for many years, both cotton and woolen machinery and worsted and silk machinery. I have designed, constructed, and operated the same of all kinds from that which manipulates the raw material from the bale to that which turns out the finished fabric. I have also taken out numerous domestic and foreign patents for the same.

Adjourned until Saturday, March 26, 1887, at 11 o'clock a. m.

SATURDAY, *March* 26, 1887—11 a. m.

Present: Messrs. Buckley and Fenton.

Examination of BARTON H. JENKS resumed.

By Mr. BUCKLEY:

Q. 3. Have you or not been in the habit of building machinery from descriptions and drawings furnished to you?

A. I have.

Q. 4. Have you read and are you familiar with the English letters patent of Joseph Beaumont, No. 1247, of 1863?

26 A. Yes, sir.

Q. 5. Have you read and are you familiar with the letters patent of James Greaves, reissued March 7, 1882, No. 10054, for condensing cylinder for carding machines?

A. Yes, sir.

Q. 6. What do you find to be the invention described and claimed in said reissued letters patent?

A. In a carding engine, a condenser or rubbing cylinder or roller, mounted on a polygonally shaped horizontal shaft, in combination with a driving gear having a sleeve-shaped bearing, the said cylinder being adapted to be revolved by a driving wheel, and at the same time to be rapidly and continuously reciprocated by suitable mechanism.

Q. 7. How many of these condensing rub-rolls are there in a nest or series in a carding machine?

A. Generally there are two sets or series, each series containing usually eight rollers or, say, four pairs.

Q. 8. These rub-rollers are set in parallel lines, are they not, to rub the sliver which passes through them?

A. They are.

Q. 9. So that any one skilled in the art would understand that when a carding machine is referred to in connection with the rigging of a rub-roll shaft reference is made to one of the shafts of the rub-rolls of these series?

A. Yes, sir.

Q. 10. Do you or not find the invention described and claimed in said reissue set forth in the said patent to Beaumont?

A. I do not.

Q. 11. Do you find in the specification of said Beaumont patent any reference to a polygonal rub-roll shaft?

A. I do not. Neither is it necessary in the construction of his rub-rollers, as set forth in his patent drawings.

Q. 12. Please explain your reasons for your conclusion.

A. In the drawings of Beaumont's patent figure 1 represents
27 but one series of rub-rollers and one doffer. In figure 2 two sets are shown. The top rubbers only are vibrated. We see that in the drawing figure 1 by having a single cam, W, which is shown in its greatest throw towards the rub-rollers, and thus vibrating the upper rollers in that direction to their fullest extent, whilst there is no cam shown in this figure for vibrating the lower rub-rollers of

this series. It would be impossible to vibrate these lower rub-rollers, as in their movement endwise in the opposite direction of the movement of the top rollers they would pass out of gear from the intermediate wheels *m m m* which drive them, and therefore their ends must always remain in line to be in gear and driven with the wheels *m m m*, as shown. The top rollers, however, are driven by wheels *p p p p* on the bottom rollers of a sufficient width to permit the vibration of the wheels of the top rollers without passing out of gear, which are very much narrower than the wheels on the bottom rubbers.

Figure 1 of the drawing shows the top rub-roller to be just one-half of the extent of its vibration, as their ends are in the same line with the ends of the bottom rollers, and also the wheels *r r r* on the top rub-rollers are in the centre of the wide wheels that drive them, *p p p*, on the bottom rollers. The cam W, however, is drawn out its full extent of throw towards the rubbing rollers, but should be drawn out one-half its throw.

Q. 13. What do you understand to be the construction intended to be shown by the square ends marked by capital A's in figure 2 of Beaumont's patent?

A. They are the ends of the bottom rollers, and are squared merely to receive the change gears spoken of in the specification. Square ends have been used in machinery as a facility in making the changes of gears from one size to another, and are as old as the time of Oliver Evans, nearly a hundred years ago.

Q. 14. How long are these square ends—that is, how far does the square part continue towards the machine?

A. The square part of these bottom roller shafts only ex-
28 tends from the ends to the inside of the gear-wheel, through which they project. The shafts inside the gear wheels are of greater diameter than the square ends, and are round.

Q. 15. Then do you or not find in the specification or drawings of this Beaumont patent anything to indicate a polygonal-shaped horizontal shaft reciprocating in its bearing or in the drive-wheels?

A. I do not; but, on the contrary, from the drawings and specifications find that such shafts are entirely unnecessary and could not be used. If the shafts of the top rub-rollers should be square the squares would be within the bearings *e f g h*, as there are no hubs of wheels or supplemental hubs or sleeves shown to receive the squares, the outside peripheries of which added hubs or sleeves should be circular to run in such bearings.

It is also unnecessary, from the fact that the driving wheels of the top rub-rollers are quite narrow, gearing into wide wheels *p p p p* on the bottom condensing rollers, which permit of their vibration.

In the drawings, figures 1 and 2, the ends of the condensing roller shafts are shown as being square to receive the change gear driving wheels thereon, but no hubs are shown connecting the wheels with the bearings, and there is nothing shown from the wheels inwardly but a round shaft continued to the end of the condensing roller, and therefore it would be impossible to vibrate the said condensing roll-

ers, as the wheels thereon would be withdrawn from the intermediate gear-wheels *c c c* that drive them.

Q. 16. Turning to figure 3 of said Beaumont patent, you will observe that the cams *w w* are in pairs—that is, for the upper series of two layers of rolls there are two cams. What does this construction mean?

A. The upper pair of cams or eccentrics *w w* are merely reinforcements of each other, or, rather, *w*, one cam or eccentric, is reinforced by a corresponding cam or eccentric for the purpose of giving additional strength to the construction. Both cams work uni-
29 formly and actuate the cross-pieces *o o*, which are united together as one piece for the purpose of additional strength. These cams are for the single purpose of vibrating the top rubbing or condensing rollers. The lower cross-piece *o* has holes through it to receive the round shafts of the lower condensing rollers upon which it slides without moving said rollers endwise. The lower pair of cams or eccentrics *w w* in figure 3 are for the purpose of actuating the top rubbing — condensing rollers of the lower set or series.

Q. 17. Can you produce a machine constructed in accordance with the description and drawings of said Beaumont patent?

A. I can. I produce model made by William Haslam, model-maker, Philadelphia.

Complainants offer in evidence said model, marked "Complainants' Exhibit No. 1.

Q. 18. Have you examined this model carefully in comparison with the drawings and specifications of the said patent?

A. I have.

Q. 19. Do you or not find any substantial differences in construction?

A. There are none. The model No. 1 represents a series of rubbing and condensing rollers for one doffer, and for additional doffer would be a duplication of the same. In a finishing carding engine having sixty ends on the cylinder thirty of these ends would be taken alternately by the top doffer and its accompanying series of rubbing and condensing rollers and deposited upon the mule spools by means of the spool drum *u v*. The bottom or lower doffer would receive the remaining thirty ends and deposit them in the same way on mule spools.

Q. 20. Have you read and are you familiar with the specifications, claims, and drawings of the Davison and Crowther British patent, dated December 5, 1856, No. 2885?

30 A. I have read and am familiar with it; I have constructed machines similar; indeed, I took the same machine, Americanized it, and built quite a number, many of which are running in the city of Philadelphia at this day.

Q. 21. Do you find the invention described in said Greaves reissued patent set forth in said Davison & Crowther patent?

A. I do not.

Q. 22. What is the construction and operation of the spindle described in said letters patent as shown in figure 2?

A. I would say that the vertical sleeve C C $C^1$ is mounted in the frame A A $A^1$, in which it revolves by means of the gearing F $F^1$. On the top of the vertical sleeve, at $C^1$, is a cap, D D, having a ring, $D^1$, secured to it, through which ring is a square hole. This cap is revolved by the top of the sleeve $C^1$ by means of a pin, E, which is secured at $C^1$, but enters loosely a hole in the cap D. The spindle B B passes through the sleeve $C^1$ and at 2 is squared, the corners of which are about the same diameter as that portion of the spindle which passes through the sleeve. This square part is of the length of the bobbin K, terminating at 3 into a round portion of the spindle. At 4 is a button, upon which the bobbin K rests. Above the button the spindle is tapered to form a steadiment for the bobbin K. The bobbin is within a conical or trumpet cap guide, I, and is held firmly within the same by the action of the weighted lever H H. In action the guide M conducts the thread to be wound upon the bobbin K to the cap I, and the square hole through the ring $D^1$ revolves the spindle by embracing the square portion thereof. As the yarn is wound upon the bobbin and filling it the spindle B is lowered until the round portion of the spindle at 3 reaches the lower edge of the square-holed ring $D^1$, when it ceases to revolve, as the round portion of the spindle B, between 3 and 4, is within cap D D. Upon the removal of the bobbin K the counterpoised lever H H lifts the spindle B until its round portion at 2 reaches the
31 under side of the square-holed ring $D^1$, and, coming in contact with it lifts the cap D D off from the pin E, and the spindle no longer revolves, so that the spindle at its lowest downthrust ceases to revolve, and also at its highest upthrust. Upon placing an empty bobbin upon the spindle it is depressed, allowing the cap D D to lower until it engages the pin E in the upper part of $C^1$, when the spindle begins to revolve and the yarn begins to wind on the empty bobbin.

Q. 23. Is there any reciprocating motion here, or is the square part of this spindle adapted to be reciprocated?

A. No; there is no reciprocating motion. It only moves one way when revolving.

Q. 24. Have you examined and are you familiar with the United States letters patent of Warth, dated August 6, 1872, No. 130,344, for cloth-cutting machines?

A. I have examined it and am acquainted with its construction.

Q. 25. Do you or not find therein anything resembling the invention set forth and claimed in said Greaves reissue?

A. I do not find anything. I find a triangular spindle, marked C, which passes through a round hole in the sleeve *g* and embraced by the rollers K K K, pivoted upon the outside of the sleeve *g* and passing through proper slots to impinge upon the three sides of the triangular portion of the shaft C, and upon its being revolved revolves the shaft C. The shaft C is thus susceptible of a to-and-fro endwise motion as well as a revolving motion. The object of this to-and-fro motion is to permit of the head K, with its

cutters, to approach and recede from the standard B in its movements upon the face of cloth to be cut into irregular shapes. It has no continuous reciprocating and revolving motion. The revolving motion is given to the sleeve *g*, and through it to the spindle C, by means of the moving cord I passing over the groove pulley H.

Q. 26. Is the object of the Warth invention the same as that of the Greaves invention; and, if so, does Warth show mechanism to accomplish that object?

32 A. It is not the same object; neither does he show a mechanism to accomplish the same result. In the Greaves patent his object has been to so construct the mechanism to revolve the rubbing rollers, and that the centres of the shafts of the pairs of rollers, one above the other, shall always be the mathematical centres of the wheels by which they are driven, so that the parallelism of the axles of the two rollers shall be maintained as the shaft or the hole through which it passes wears.

Q. 27. What is the result of wear of the round shaft and feather and its bearing in the wheel by which it is revolved?

A. It is of prime necessity that the axis of a pair of rubbing rollers, one over the other, should be perfectly parallel in their reciprocating motion that the roving or slubbing may be uniformly condensed. In the wear of the round shaft and feather in its bearing these parallel lines are not maintained, but the vertical planes of the axles of the rub-rollers would cross each other. Thus the ends of the rubbing rollers would not condense the slubbing sufficiently, and where the rollers crossed each other the rubbing would be so severe as to cause twits in the roving, which would not be drawn out in spinning.

Q. 28. What would be the difference in the action of the two shafts, a round shaft with a feather and a square shaft, as they become worn?

A. The round shaft and feather in its wearing would throw the centre lines of the pairs of rubbing rollers out of parallel with each other, whilst in the square shaft wearing they would maintain a central position with each other and the wearing of the shafts would be towards an octagonal shape.

(Counsel for defendants stipulates that he only relies upon the patents set forth in his printed record as anticipating the plaintiffs in this action, excluding the patents of Harraday and of
33 Warth, No. 13343, and English patent of Leigh, No. 13027, of 1850, mentioned on page twelve of defendants' printed record.)

BARTON H. JENKS, a witness on behalf of complainants, having been heretofore examined in chief, was cross-examined as follows:

By Mr. FENTON:

X Q. 29. Why do you say in answer to question 12 that the English Beaumont patent drawing does not show more than a single cam for reciprocating the rub-roll shaft? Please look at Fig. 3.

A. On looking down on Fig. 1 I see but one eccentric for recip-

rocating the rub-rollers, and on looking at Fig. 3 I see that the under eccentric is only auxiliary to the upper one to move in the same direction at the same time. They move together.

X Q. 30. Is not the latter statement an inference of yours from the drawing only and without any description thereof in the specification?

A. It is not such an inference as observed in Fig. 3 of the drawing, where the eccentric *w* with its auxiliary eccentric *w* are both connected with the cross-pieces *o o*, and that these two cross-pieces are united together so that they are both moved endwise simultaneously.

X Q. 31. For what purpose do you think the auxiliary eccentric is added to that machine?

A. For the purpose of reinforcing and adding strength to the mechanism.

X Q. 32. Is not that a very expensive way of adding strength?

A. It appears to have been the way Mr. Beaumont selected.

(Question repeated.)

A. I think not. Of course, by having two eccentrics, *w w*, connected with the two cross-pieces *o o*, which are as one piece, they would be carried more correctly in a vertical position than if
34 there was the use of but a single eccentric, and an object would be obtained by holding the upper cross-piece *o* perfectly vertical and preventing binding on the washers and shafts of the upper rub-rolls.

X Q. 33. If the auxiliary eccentric was not connected with the upper one in the manner that you claim it is, but was connected by a gearing unseen in the drawing, could it not be used under such circumstances for vibrating the lower rub-roll?

A. No, sir; it could not, as the wheels *m m m* (see Fig. 1) on the lower revolving rollers would pass out of grear with the intermediate wheels C C, which connect them and revolve them, as seen in the same Fig., 1.

X Q. 34. What is the motion of a shaft in the condensing carding engine, which is both a roller and a rubber?

A. It revolves and at the same time vibrates or reciprocates.

X Q. 35. Then if in describing a condensing carding engine with top and bottom rub-rolls you were told that "certain of the rollers act as bottom rollers and rubbers and the other rollers act as top rollers and rubbers," what would you understand to be the motion of those parts?

A. In factory parlance I would understand that the top rollers revolved and vibrated, and that the bottom rollers need only revolve, acting, as it were, as an anvil to be impinged upon by the reciprocating top roller. In the same parlance all the rollers between which the slubbing or roving passes are called rub-rollers, and we designate them as a rubber condenser of six rub-rollers, where there would be two series of three pairs each, or, if four pairs of rub-rollers, a condenser of eight rub-rollers, and often we would say one rub-roller where that roller impinged upon a belt acting in place of lower rollers.

X Q. 36. Have you ever seen a condensing carding engine with a square shaft to the rubber roller?

A. I have.

35 X Q. 37. Why is it made square instead of triangular, and would there be any difference between the two either in operation or result produced?

A. I think that a square rub-roll shaft passing through a proper square bearing would maintain a central position as to that bearing, when worn, better than a three-sided or a triangular-shaped end or rubber shaft, as in the first instance the wear would be in the direction of forming an octagon shape, whereas in the latter it would partake somewhat of the hexagonal shape, but the angles of the latter would be more acute and have a tendency to wedge themselves as they revolved out of the central line.

X Q. 38. Would they operate on the same principle?

A. They would.

X Q. 39. Would a hexagonal shaft or an octagonal shaft operate upon the same principle as the square shaft or the triangular shaft?

A. It would—that is, while the rub-roller was being reciprocated it would be revolved through the driving bearing; that it was the proper shape to receive the end of the various polygonal-shaped rubbing rollers.

X Q. 40. What do you understand to be the limits of shape included within the word "polygonal" as it is used in the claim of this reissued patent?

A. There is scarcely any limit to the number of sides.

X Q. 41. Then I understand you that there is practically no limit to the maximum number of sides. What is the limit to the minimum number of sides?

A. I would say two, not counting thickness, as the blade of a knife, the two sides would be the flat sides of the blade, the back and edge of the blade not to be counted.

(Counsel for complainants is willing to admit that the term polygonal signifies three or more sides to the object to which it is applied.)

X Q. 42. In view of your knowledge of the principle of operation of this device as shown in the patent and the result aimed at, what is the minimum number of sides included within the term polygonal in this patent?

36 A. I should say three.

X Q. 43. Why not two?

A. I am unable to see how you could get two sides without the cross-section being a parallelogram, which would have four sides, or a tetragon.

X Q. 44. If you were furnished with an instance in which there was a round shaft containing upon its longitudinal periphery two angular points and fitted in a correspondingly recessed bearing or head, would it not answer all the purposes of a three-sided or a four-sided shaft; and, if so, be within the terms of this patent?

A. The cross-section of such a figure would not be a polygon, and

I think that in the wearing of the angular points it would not maintain its central position as perfectly as a four-sided or square shaft.

X Q. 45. Why not?

A. In answer to that question I refer to my answer to X Q. 37. I think a square shaft would give more bearing surface than the two points referred to.

X Q. 46. With a square shaft is the flat side or body of the shaft worn any in use, or does the wear come entirely upon the angles or corners?

A. The wear is all on four sides, and that reduces the size of the shaft in cross-section.

X Q. 47. Did you ever see a shaft with two splines or feathers on opposite sides? I am not now speaking particularly of the rub-roll shafts, but any kind of a shaft having a rotating as well as a reciprocating motion.

A. I have. A very common mode of constructing large gearing for driving shafting in various rooms in factories where one wheel is to be thrown out of gear with another having a sliding end motion for that purpose.

X Q. 48. How long has that been known in the art?

A. I should think about fifty to one hundred years; especially where the splines pass through a pair of hubs secured to a frame to hold them parallel.

37 X Q. 49. Looking at the complainants' patent and the original patent upon which it is founded, I call your attention to that figure in the original showing the round shaft with a spline or feather. Will you please explain why a shaft with three or four sides will wear longer and centre better than a shaft with a single bearing side, as in the case of the old round shaft and feather?

A. In the case of a round shaft with a feather the force is on one side of the feather to revolve the shaft, which gives a leverage equal to the full diameter of the shaft and pressing on the lower part of the round shaft opposite to the feather, causing it to wear rapidly and destroying its central alignment, whilst in the square shaft the wear is on the four sides uniformly, and by its motion, even though smaller than the bearing, will maintain its central position even up to the wear that prevents its revolving within the bearing, or, in in other words, until the length of the diagonal of the cross-section of the square shaft becomes less than the length of the side of the cross-section of the bearing in which it reciprocates.

X Q. 50. Then, if I understand the distinction correctly, it is not so much a case of less wear between a square shaft and a round shaft with a feather, but a case of more evenly distributed wear, due to the angular points of contact of the polygonal shaft with the angular points of contact in the recessed bearing. Is that so?

A. Yes, sir. In the squareshaft, as it partakes of an octagonal shape spoken of in a former answer, the wearing surface becomes greater proportionately as to its wear, whilst in a round shaft with a feather the distribution of wear is entirely different. The wear

on a round shaft, which would be on the periphery opposite the feather, would, in a square shaft, be distributed on the four sides of the square.

X Q. 51. Suppose the round shaft was supplied with two longitudinal feathers upon opposite points of the periphery of the shaft, would the wear then be distributed to two points of the round shaft instead of one?

38 A. It would be upon the two feathers.

X Q. 52. Then if, as you have explained, in the case of a shaft with a single feather, the wear would be upon one point of the shaft opposite the feather, so in case of a round shaft with two feathers upon opposite sides the wear would be upon two points instead of one?

A. It would be upon three points. It would be upon the two feathers and that portion of the body of the diameter of the shaft that was immediately between the two.

X Q. 53. In the case of a triangular or square shaft is it anything else than the three or four angles, respectively, that maintain the even distribution of wear and evenness of centre?

A. It is not.

X Q. 54. Suppose that a round shaft had been constructed with four splines or feathers equidistant from each other on the periphery of the shaft, would not such a shaft operate in substantially the same manner as the square shaft and be within the terms of this patent as the equivalent of the square shaft?

A. I think not. I think the wear would be distributed on four sides instead of two or one, as in the case above mentioned, and would partake of a wobbling motion.

X Q. 55. Would not the square shaft partake of the same wobbling motion in the square recess as soon as the corners began to wear off?

A. I think not.

X Q. 56. Why not?

A. As the cross-sections of two squares, one smaller than the other, the four sides of the squares would hold themselves central.

X Q. 57. Have you not already testified that those four points in course of time wear off so that a square is reduced to the form of an octagon?

A. Yes, sir.

X Q. 58. Then, as the four points of the square are worn

39 off, is there not a wobbling motion precisely the same as in the case of a wrench acting upon a square T?

A. No; because in wearing there is a corresponding octagonal shape given to the bearing having flat sides.

X Q. 59. Do you mean to say that there is no wear in the bearing at all?

A. I say that the bearing partakes of the octagonal shape also.

X Q. 60. Is this a theory of yours or is it in practical experience, that square shaft?

A. I have practical experience of square shafts revolving a disk

having a square hole upon a square shaft that was smaller in its cross-section.

X Q. 61. In course of time even the square shaft on a rubber roll becomes worn out and not parallel with another square shaft roll beneath it; is not that so?

A. No; the wear of the two pairs of shafts would maintain their central positions and remain the same distance apart at all times until worn to destruction.

X Q. 62. When does the point of wear to destruction arrive?

A. When the wheel or bearing would no longer turn the shaft.

X Q. 63. Will you please conclude your testimony by explaining the principle of construction of the square shaft and distinguishing it from a round shaft with a feather, if there is any difference?

A There is considerable difference. One is circular or round and the other is four-sided, which is apparent to the eye. The principle of the construction of the square shaft is to have its four sides parallel with each other and the corners all right angles, the object, as stated heretofore in my answer, being that while it reciprocates it will turn with the revolving hub gearing and evenly distribute the wear around its four sides and maintain its central position. The difference between that and the round shaft with the feather is that while the feather is put there for the purpose of being turned by the hub the single point of contact throws all the wear to one point in the round shaft, to wit, opposite the feather.

BARTON H. JENKS.

Sworn and subscribed before me this twenty-eighth day of March, A. D. 1887.

FRANCIS SHUNK BROWN, *Examiner.*

JOHN DOBSON *et al.*
*vs.*
JAMES LEES *et al.*

MONDAY, *March* 28, 1887—12 m.

Present: Messrs. Buckley and Fenton.

WILLIAM HASLAM, a witness on behalf of complainants, having been duly sworn, was examined as follows:

By Mr. BUCKLEY:

Question 1. What is your name, age, residence, and occupation?

Answer. My name is William Haslam, and my age is forty-eight; occupation, pattern and model maker; place of business, 812 Race street, Philadelphia.

Q. 2. Are you a machinist?

A. No, sir; not by profession. I have got a machine shop; still I served my time at pattern-making.

Q. 3. How long has this been your occupation?

A. I went at it thirty-two years ago—that is, started my business—my trade. I served my time at the Industrial Works, and have been at it ever since.

41 Q. 4. Have you any acquaintance with the construction of models of machinery of various descriptions from drafts or plans?

A. Yes, sir.

Q. 5. What is your knowledge of so constructing models or machinery?

A. I consider myself perfectly familiar with it, from general knowledge of my own business and my father before me, being with him about machine shops, and so forth. I can read and thoroughly understand drawings, and know all the working parts about them. It is almost a necessity, to be a thorough pattern-maker, to have an idea of both moulding and machine work and mechanics in general.

Q. 6. These patterns which you have constructed from drafts or drawings have been the patterns for models and working machinery?

A. All kinds of working machinery; yes, sir.

Q. 7. Patterns from which the castings were made for machinery?

A. Yes, sir.

Q. 8. What classes of machinery have you so constructed patterns for?

A. Pretty much all classes—complicated and simple.

Q. 9. Have you ever built the machines from those patterns?

A. Yes, sir; built the machines.

Q. 10. Working machines?

A. Yes, sir.

Q. 11. How long have you been in the habit of doing that?

A. I have had the machine shop connected with my pattern shop for these last seven years—perhaps a little longer; I couldn't just positively say from memory. I had one apprentice for five years. I was there for some time, and he has been through some time; so, put those two together, I have been there somewhere in the neighborhood of seven years.

42 Q. 12. Have you read and are you familiar with the English letters patent of Beaumont of 1863, No. 1247?

A. Sufficient to make myself acquainted to make the model as here, and that is about all the particular knowledge of this one machine, and seeing a working machine for doing the same work. I have examined machines for the purpose for which this machine is before constructing this.

(Witness points to the model, "Complainants' Exhibit Model 1," and says: I constructed that model from the description and drawings of said English patent.)

Q. 13. This model, "Exhibit 1," in your view, was constructed according to the drawing and descriptions in that patent?

A. Yes, sir.

Q. 14. In view of those drawings and that description in the patent, which of these series of rolls reciprocate and revolve?

A. The upper or small rolls. The lower rub-rolls are fixed against reciprocation and could not reciprocate. I can hardly see

how I can say any more than that the machine, "Complainants' Exhibit Model 1," was constructed in exact accordance with the drawings of said patent and the description thereof. The square ends on the shafts of the lower rollers, marked A A, Fig. 2, are simply short square ends to receive the square hub of variously sized pinion wheels, which latter can be changed at will to increase or diminish the speed of the revolution of the rollers.

Q. 15. How many men do you employ at your establishment?

A. We employ about a dozen; on an average, a dozen.

Cross-examination by Mr. FENTON:

X Q. 16. Where did you obtain the copy of the English patent from which you made the model?

A. From Mr. Buckley.

43 X Q. 17. Is the model made the size of the drawing or to a scale?

A. (After referring to patent.) It is the full size of the drawing in the English patent.

X Q. 18. Was it explained to you by Mr. Buckley or by any one else?

A. No, sir; no explanation given, any more than they asked me whether I could construct one according to that, which I told them I could.

X Q. 19. Was there a discussion between you and counsel as to whether the lower rub-rolls reciprocated?

A. What would you call as counsel?

X Q. 20. Mr. Buckley.

A. I think there was something said about that question, but I took no particular note of it. We talked the matter over in a general way.

X Q. 21. Was there a discussion between you and Mr. Buckley, the counsel, as to whether the shafts on the lower rub-rolls were square or round?

A. No, sir; not to my knowledge; nothing said about it. In fact, there was very little said about it. The question asked was whether I could construct it like that.

X Q. 22. Why do you think from this drawing alone that the lower end of the rub-roll shaft on the part that projects beyond the hub is square, while the inside part is round?

A. I think it is on account that they sometimes work in different material and would want to change the speeds of the different rollers along as the different material would elongate or not passing through, and twisting and finished. It is sometimes necessary to change these. They want to do it rapidly and have it for convenience, doing away with set-screws, and so forth. That would be my idea of it.

X Q. 23. Is the inner portion of that rub-roll and shaft shown on these drawings?

A. They are shown on the drawing, I should say.

X Q. 24. Where?

44 A. They are shown in this way: They are of the same size in that point as the other because they are connected with the gear-wheel, and consequently must be, but they come directly under the upper roll shaft. In the other view shown these gear-wheels are fastened on the lower shaft. There must be a connection there, while the upper shaft covers it, that you do not absolutely see it.

X Q. 25. So that the drawing does not absolutely show whether the inside of the lower rub-roll shaft is square or round, does it?

A. No, sir; it does not show whether it is square or round.

X Q. 26. Did you make this model in exact accordance with the drawings, as far as you understood them?

A. Yes, sir; to the best of my knowledge.

X Q. 27. Do the upper rub-rolls reciprocate, as stated in the patent?

A. The upper rub-rolls reciprocate, I should say, and I so made it.

X Q. 28. Do they reciprocate in this model?

A. Yes, sir.

X Q. 29. Will you show me that?

(Witness illustrated by model.)

X Q. 30. Is there any arrangement in that model for rotating the rub-rolls simultaneously with their reciprocating motion?

A. There is a shaft and pulley there (indicating). The drawing here does not show where the connection is made; consequently on the model it does not show. It shows a flange, shaft, and pulley the same as the drawing shows.

X Q. 31. Have you had any experience in constructing or operating condensing carding machines or in making models therefor?

A. No, sir; nothing outside of this model.

X Q. 32. Have you examined machines for that purpose?

A. I have examined one; yes, sir.

45 X Q. 33. Do you understand the terms drawing and rubbing with respect to the rub-rolls in the condensing card?

A. Yes, sir.

X Q. 34. Suppose you were told, on seeing a condensing carding engine, that one or more of these rolls were both rubbers and rollers, what would you understand to be the motion of such a mechanism?

A. If they were both rubbers and rollers they both reciprocate; one, I should say, would go one way while the other was passing the other and rolling and revolving together.

X Q. 35. If you were shown a condensing carding engine not in operation, and one of the rub-rolls was pointed out to you, and you were told that it was a "roller and rubber," what would you understand was the motion of that rub-roll?

A. It reciprocates and rolls—draws.

X Q. 36. Do you mean that its motion is the reciprocating motion simultaneously with its rolls?

(Counsel for complainants objects to the question asking the witness as to the terms used in the art of carding, as he has not been shown to be an expert, with a knowledge of the terms used in that particular art.)

A. Revolving; yes, sir.

X Q. 37. Why did you go to see a condensing carding engine before you constructed this model?

A. To get some knowledge of the working of it.

Redirect examination by Mr. BUCKLEY:

R. D. Q. 38. Looking at the top view in figure 1 of said patent, what do you find to be the parts which I have marked with X therein?

A. It might be an upper or a lower shaft, but the upper and
46 lower are of a size, I should say, because there must be a connection between the upper roller and the gear of the lower shaft.

R. D. Q. 39. Looking down from the top as you have constructed in the model, do you not find that the ends of the shafts of the upper rub-rolls terminate just outside of their bearing, so as to expose the shafts of the lower rub-rolls beneath them inside of the pinion?

A. The drawing there, I should say, looked as though it continued on up to the gear-wheel. There is no point of stopping until it comes to the gear-wheel on this view (Fig. 1), and here it shows there is a connection between the lower roller and the shafts to connect it with the gear. This (indicating) is an idler between that connects. The upper and lower of this is out; it does not show it. It shows that the shafts are there, but there is no connection. It is above that altogether.

R. D. Q. 40. It does not show the terminal point?

A. No; it does not show the terminal point, because the shaft runs over that washer at that point.

R. D. Q. 41. You see in Fig. 3 of this patent there are double sets of rigging shown?

A. You can put up as many as you please, as I understand it, one on top of the other.

R. D. Q. 42. How many have you shown?

A. One only.

R. D. Q. 43. But you can duplicate the numbers of sets to as great an extent as you please?

A. Yes, sir.

By agreement of counsel witness signed stenographic notes.

WILLIAM HASLAM.

Sworn and subscribed before me this twenty-ninth day March, A. D. 1887.

FRANCIS SHUNK BROWN, *Examiner.*

47 GEORGE E. BUCKLEY, complainants' counsel, being duly sworn, deposes and says as follows:

I was attorney for the applicant, Greaves, in obtaining for him the original patent upon which reissue No. 10054 is based. In said original patent the said Greaves had two claims, one of which was

for a combination with the rub-roll of a shaft made of cast iron reciprocating in a cast-iron hub in a driving wheel, and the other claim was for such a shaft made in polygonal form reciprocating in a correspondingly shaped hole in the driving wheel. Both these claims had been prosecuted in the Patent Office for the said Greaves by other attorneys, and after several appeals both had been rejected. Another applicant, named Stone, who was contending for the latter claim and also prosecuted his case upon appeal all the way to the Commissioner of Patents, had been finally rejected, and it therefore appeared to be a hopeless task to obtain a patent for the latter claim.

When I took charge of the case the Commissioner referred it back to the examiner, who again rejected it. It was then appealed to the board of examiners-in-chief, and they allowed the first claim, but rejected the claim to the polygonal shaft. Greaves had instructed me to push the case and to obtain both claims if possible; but, considering the matter hopeless, I erased the second claim and took out the patent on the first. At that time it was the custom in the Patent Office to date the patents as of the first Tuesday succeeding the payment of the final fee, although the patent was not issued until two weeks later than the date thereof, so that though said original patent was dated February 20, 1877, it was not actually issued until March 6, 1877, and received in Philadelphia by mail from the Patent Office upon March 7th of that year. A day or so thereafter, upon my notifying him, the said Greaves came to my office and asked me what the patent covered. Upon my informing him he said that he wanted the square shaft, and that I must get that claim.

I told him about the difficulties in the way and why I had
48 acted as I had, but he reiterated his request and said that he did not want me nor ever did want me to drop that claim, and insisted on my immediately correcting what I had done. He said he never authorized me to drop that claim, and that without that claim the patent was no good to him. I then said the only way in which we could correct it would be by reissuing immediately. He and his assignees were equally anxious that this claim should be obtained, and they ordered me to prepare the papers for reissue immediately so as to get the patent as soon as possible, even if I had to make more appeals than I had done before.

Acting upon their instructions, as soon as I could give the matter my attention I applied for the reissue, embracing in it the claim which I had; without their instructions, formerly erased. This application for reissue was filed on March 24, 1877, in the Patent Office—that is, in exactly fourteen days after the issue of the original the application for the reissue was on file in the office. The application for reissue was in two divisions—A and B. Division A embraced the claim to the polygonal shaft. The examiners rejected division A, and it was appealed to the board of examiners-in-chief; but in their decision rejecting it this board simply rejected it *pro forma* as being matter already adjudicated by the Commissioner, a higher tribunal, but embracing in their decision a recommendation of patentable merit. It was then appealed to the Commissioner, who eventually allowed the application, concluding it was not met by the ref-

erences which had formerly been cited against it. The decision that division A was patentable also gave life to the old application of Stone, which was for the same thing, and the two applications were placed in interference. After a long and arduous contest, in which both parties spent many thousands of dollars, the aggregate cost to both parties being about $15,000 in counsel fees and expenses, the interference was decided in favor of Greaves.

In order to show that Greaves' intention was that the claim
49 embraced in division A should be prosecuted to the utmost I would say that prior to his placing me in charge of his original application he brought to me a patent upon which he desired me to bring suit against certain alleged infringers. This patent was for a combination of a rub-roll with a shaft adapted to be removed therefrom. They are generally soldered in place, and are thus fixed. His drawing in this case showed a square shaft, but his patent covered the removable feature. This patent he had applied for and obtained during the pendency of his original application herein. Knowing nothing of his original application at that time, and having discovered that the defendants did not use the removable feature of his device, which was the sole thing covered by the patent—they had used the square shaft—I told him if he had but a claim to the square shaft he could hold them for infringement. He then informed me that he had an application pending in the Patent Office for a square shaft, but he had been unable so far to obtain a patent. He asked me to look into it. I told him I would do so, providing he could pay for the trouble. He then got some friends to put up the money for him upon receiving an assignment of part interest in his invention, and the examination was made, and his action was then based upon his desire to obtain a patent for that polygonal rub-roll shaft, and it was not through any instructions of his, but through utter hopelessness of obtaining it, that I erased that claim at the time I accepted the patent for the cast-iron shaft; and, as I have stated before, immediately upon his discovering this he gave me orders to go back and use further endeavor to get that claim, which I did, with the above-mentioned result.

GEORGE E. BUCKLEY, complainants' counsel, recalled.

Subject to the objections to the testimony of Mr. Buckley as to any matters of record in the Patent Office, Mr. FENTON cross-examines him as follows:

X Q. 1. Before filing the amendment erasing the second
50 claim of the original application, as you were recommended to do by the decision of the board of the examiners-in-chief, did you advise Mr. Greaves of that decision?

A. No, sir.

X Q. 2. Before filing the amendment, as directed in the decision of the Commissioner of Patents on the original interference under date of February 9, 1877, did you advise Mr. Greaves of that decision?

A. I did not consult him, because I knew that he did not wish to include cast brass.

X Q. 3. Would you have the kindness to state why the application for the reissue in suit was filed without a power of attorney, which was not forthcoming and on the file for two or three weeks after the presentation of the application, or was that a mere oversight?

A. I do not recollect that such a circumstance occurred, but if it did occur it was a mere oversight, because I was empowered to act by all the parties, and the case may have gone to the office with that omission by accident.

X Q. 4. My object of inquiry is whether or not Mr. Greaves filed that application for the reissue and afterwards retained you as prosecutor, or did you file it for him?

A. I filed it for him. I will state also that in referring to matters which are things of record in the Patent Office in that interference I may have made slight errors which are not material.

Redirect:

Mr. Greaves always said that the hard cast-iron shaft working in the hard cast-iron driving wheel produced a polished hard surface, both on the shaft and on the interior of the bore of the driving wheel.

GEORGE E. BUCKLEY.

Sworn and subscribed before me this twenty-seventh day of March, A. D. 1887.

FRANCIS SHUNK BROWN, *Examiner.*

51 It is stipulated and agreed by counsel for the respective parties that the following testimony of Thomas Schofield, taken in the interference case of Stone *vs.* Greaves in the United States Patent Office, shall be incorporated as part of complainants' rebuttal with the same effect as if he had been sworn in this cause and as if the said testimony had been regularly taken herein.

THOMAS SCHOFIELD, being sworn, was examined by Mr. BUCKLEY:

Question. What is your name, age, residence, and occupation?

Answer. My name is Thomas Schofield; age, forty; residence, Manayunk; and occupation, manufacturer of carpet yarns.

Q. 2. Do you use carding machines in your mill?

A. Yes, sir.

Q. 3. What sort of rub-rolls and shafts do you use in carding machines in your mill?

A. We use the square, and also the round with a feather.

Q. 4. Please describe the square and its connection with the rub-roll shaft and the wheel.

A. The square is a square shaft soldered into the rub-roller in the usual form—the same as they always have been—working into a

wheel with a square hole in. That is the machine exactly as we are working (referring to "Greaves Exhibit 1," February 18, 1878).

Q. 5. When and where did you first see such a square-shanked rub-roll?

A. The first I ever saw of a square-shaft rubber was in my factory, about October or November, 1871.

Q. 6. Please state how many you at that time had in your mill, and in what way they were used.

A. We put on at that time in this shape (referring to "Greaves Exhibit 1"). We sawed off the old spindle, filed out the
52 wheels, and made the attachment just in this way—with a gas-pipe coupling to the end of the rub-roll, the shaft of which had been sawed off short.

Q. 7. How did you make that connection on that short shaft?

A. I set the taps and dies and put a thread on just similar to "Exhibit Greaves 1."

Q. 8. By whose orders or directions or suggestion was this done?

A. By the suggestion of Mr. Greaves, who was carding for me at that time.

Q. 9. How did you fix the date as being in October or November, 1871?

A. Well, I couldn't fix the date positively to a day.

Q. 10. How do you fix it as being the latter part of 1871?

A. We moved to that place in 1870—August, 1870—and it was about a year afterwards when we put these things on.

Q. 11. What did you put them onto?

A. Onto a carding machine.

Q. 12. How long were they in that carding machine working?

A. They were working from that time until the 8th of June last, when the place was burnt out.

Q. 13. Were they or were they not successful in operation?

A. They were so much of a success that we adopted them altogether.

Q. 14. Did you ever put any more than these two square shanks in your carding machines in your mill?

A. Yes, sir.

Q. 15. Please state when, and about how many.

A. February, 1872. We put in twenty-four of them at one time.

Q. 16. What enables you to fix the date at which you put those in?

A. I fix the date from the time they drew the water out
53 of the canal, which was in February, 1872. That was the time we always set out to do our repairing, as we always knew the water was going out at that time.

Q. 17. By what power do you run your mill?

A. Water-power from the canal.

Q. 18. What were Mr. Greaves' circumstances pecuniarily all the time?

A. I should judge he was rather poorly off. He borrowed fifty dollars off of me to make his application for the patent. I think it was for that purpose.

Cross-examination by Mr. RICE:

X Q. 19. Where was your mill located which burned the 8th of June last, as you have mentioned?

A. It was located on the canal bank.

X Q. 20. Give the street and place in which it was located as nearly as you can.

A. Flat Rock road, above Washington street, Manayunk.

X Q. 21. How large an establishment was it and how many carding machines did you use in it?

A. The mill that was burnt was sixty by forty feet; twelve carding machines.

X Q. 22. What other business or work did you carry on in that mill in the preparation of wool besides carding it, if any?

A. Spinning and the preparation before it came to the cards, of course.

X Q. 23. About how many hands did you customarily employ in that mill from the time you moved there until it was burned?

A. About twenty-three.

X Q. 24. When and where did you first know James Greaves, one of the parties in this case?

A. James Greaves came to work for me about 1868.

X Q. 25. Where had James Greaves been working or em-
54 ployed, if you know, before he commenced work for you, in 1868?

A. He was working for Mr. Barker, on Mill creek, about half a mile from where I was located at the time.

X Q. 26. About what time in 1868 did James Greaves commence working for you?

A. I think he commenced working for me in the summer time.

X Q. 27. Then it was something over three years after James Greaves commenced working for you that you put the first square rub-roll shaft into your mill, was it not?

A. I think it was.

(Question and answer objected to, as witness is asked generally and not as to his own knowledge.)

X Q. 28. Did you make an affidavit for James Greaves, or to be used in the application for his patent on the invention in controversy?

A. I think I did.

X Q. 29. Did you make this affidavit before or after he borrowed the $50 of you?

(Objected to as immaterial, and all testimony relating to that affidavit.)

A. Before.

X. Q. 30. How long before, as nearly as you can state?

A. Well, I should judge in the neighborhood of about three months.

X Q. 31. Did you make this affidavit before or after you put the first square rub-roll shaft into your mill?

A. I made it after I put the square rub-roll shaft in.

X Q. 32. How long after you put the first one in, as nearly as you can state?

(Objected to as immaterial.)

A. I don't understand that question. Let us have that again.

X Q. 33. You state you made an affidavit after you put the
55 first square rub-roll shaft in. How long after, as nearly as you can state?

(This is objected to as calling for oral testimony as to the date of the document, which is of record in the case, and all further testimony upon this subject is objected to as not cross-examination and unless the affidavit is produced and shown to the witness.)

A. How long after I put the first rub-roll shaft in did I make that affidavit—that is what you want to find out?

(Mr. Buckley makes further objection that the witness has already stated about when he put the first rub-roll shaft in, and the date of the affidavit is upon the affidavit. The document itself, therefore, is the best evidence of when it was made.

X Q. 34. Yes. State, as nearly as you can now recollect, how long it was after you put the first rub-roll shaft in made square that you made that affidavit?

A. I should judge it would be twelve or fifteen months after.

X Q. 35. How many rub-rolls were there on each carding machine in your mill that was burned?

A. Eighteen—that is, on each condenser. They were not all condensers; six condensers.

X Q. 36. Did you use all six of those condensers from 1870 up to the time the mill was burned?

A. No, sir.

X Q. 37. How many of them did you commence to use when you moved there, in 1870?

A. We used three when we moved there first.

X Q. 38. When did you procure the other three, as nearly as you can state?

A. I procured one, I should judge, about two months after I moved there; the other two in the spring following.

X Q. 39. How long after 1870 did James Greaves continue to work for you?

56 A. He continued to work for me up to the present time.

X Q. 40. Have you any interest or ownership, directly or indirectly, in the letters patent of James Greaves here in question?

A. No, sir.

X Q. 41 How many condensers of carding machines did you put the twenty-four square rub-roll shafts onto?

A. Two.

X Q. 42. What kind of rub-roll shafts did you continue to use on the other condensers in your mill?

A. We put in the squares as the others wore out.

X Q. 43. Previous to the time when you put in the first square rub-roll shaft did you use in your condensers the rub-roll shafts of the kind with which they were originally provided?

A. Partly we did and partly we did not.

X Q. 44. What other kinds did you use?

A. We used a cast-iron spindle; it is all the same thing; it runs the rubber.

X Q. 45. You put on the twenty-four square rub-roll shafts to your two condensers within two or three months after you put the first one into a condenser, did you not?

A. I did not.

X Q. 46. Did you put the twenty-four square rub-roll shafts into your two condensers within five months after you put on the first square rub-roll shaft, as you have testified?

A. I did not.

X Q. 47. Did you put on the twenty-four square rub-roll shafts to your two condensers within nine months after you put in the first square rub-roll shaft to a condenser, as you have testified?

A. I don't think I did.

X Q. 48. Did you put the twenty-four square rub-roll shafts
57 onto your two condensers, as you have testified, within twelve months after you put the first square rub-roll shaft into a condenser, as you have testified?

A. I judge it was from twelve to fifteen months.

X Q. 49. How long, as nearly as you can state, had you used the twenty-four square rub-roll shafts put into your two condensers, as testified, when your mill was burned, in 1877?

(Objected to as already answered.)

A. I used them from February, 1872, till the 8th of June, 1877.

X Q. 50. How long had you used the cast-iron spindle or shaft upon your rub-rolls before you put in your first square spindle, as you have mentioned?

(Objected to as immaterial.)

A. I think we commenced to use the cast-iron spindles in 1870.

X Q. 51. How many cast-iron spindles did you put into your condensers upon the rub-rolls, as nearly as you can state, before you put in the first square spindle, as testified?

(Objected to as already answered.)

A. I should judge we had twelve or fifteen, maybe.

X Q. 52. Did you put in these twelve or fifteen cast-iron spindles at or about the same time?

A. Same time as what? I don't understand that question.

X Q. 53. Same time as each other. Did you put them all in at or about the same time or at different times?

(Objected to as immaterial.)

A. At different times, just as one wore out.

X Q. 54. What was the shape of these twelve or fifteen cast-iron spindles? Describe them.

A. Just the same shape as the ordinary spindle or shaft or gudgeon ordinarily used in the rub-roll.

X Q. 55. How many of these cast-iron spindles did you
58 put into your condensers in the first place, and about what time in the year did you put them in?

(Objected to as immaterial.)

A. We put them in in the fall of 1870. How many we put in at once I am unable to state. As near as my recollection runs, I put them in just one or two at a time as the others gave way.

* * * * * * *

THOMAS SCHOFIELD.

Sworn before me the eighteenth day of February, A. D. 1878.

JOHN G. BOWMAN,
*Notary Public.*

59 United States Circuit Court, Eastern District of Pennsylvania.
In Equity.

DOBSON *et al.* *vs.* LEES *et al.* } No. 59, April Sessions, 1882.

Testimony on behalf of defendants, taken before Francis S. Brown, Esq., notary public, examiner, appointed by stipulation of parties.

Parties met, pursuant to notice, at the office of Hector T. Fenton, 905 Walnut street, in the city of Philadelphia, on Friday, November 14, 1884, at 11 o'clock a. m.

Present: George E. Buckley, Esq., for complainants; Hector T. Fenton, Esq., for respondents.

Counsel for respondents offers in evidence—

I. Patent Office copy of original letters patent (certificate waived), dated February 20th, 1877, No. 187,620, granted to James Greaves, for improvement in condensing cylinders for carding engines, marked Defendants' Exhibit 1.

II. Certified copy of file and contents of application for said letters patent 187,620, marked Exhibit 2.

60 III. Patent Office copy of letters patent (certificate waived), being reissue, dated November 23, 1880, No. 9477, division B, issued to the plaintiffs, marked Exhibit 3.

IV. Certified copy of the file and contents in application for reissue No. 10054, marked Exhibit 4.

V. Certified copy of file and contents in application for reissue No. 9477, marked Exhibit 5.

VI. Patent Office copy (certificate waived) of United States patent

granted to J. Harraday, No. 10986, dated May 30, 1854, marked Exhibit 6.

VII. Patent Office copy (certificate waived) of United States patent granted to Albin Worth, No. 130,343, dated August 6, 1872, marked Exhibit 7.

VIII. Patent Office copy (certificate waived) of United States patent granted to Albin Worth, No. 130,344, dated August 6, 1872, marked Exhibit 8.

IX. Patent Office copy (certificate waived) of English patent granted to Davison & Crowther, No. 2885, dated December 5, 1856, marked Exhibit 9.

X. Patent Office copy (certificate waived) of English patent granted to Evan Leigh, No. 13027, dated March 26, 1850, marked Exhibit 10.

XI. Patent Office copy (certificate waived) of English patent No. 1247, dated May 18, 1863, to Joseph Beaumont, marked Exhibit 11.

XII. Also certified copy of the entire proceedings in the Pat-
61 ent Office in the matter of the several appeals and interference relating to the original and reissued patents on which the bill is founded, being in certificates, marked, respectively, Exhibits 12, 13, 14, 15, 16, 17, 18, and 19.

XIII. Patent Office copy (certificate waived) of United States patent to James Greaves, No. 152,628, dated June 30, 1874, marked Exhibit 20.

Adjourned to meet pursuant to notice.

WEDNESDAY, *October* 7, 1885—3 p. m.

Present: Geo. E. Buckley, Esq., solicitor for complainants; H. T. Fenton, Esq., solicitor for respondents.

JOSEPH WADE, being duly sworn, and examined by Mr. FENTON, did depose and say:

I reside at Bridgeport, Montgomery county, Pennsylvania. I am fifty-three years of age, and I am the superintendent of the Minerva Woolen Mills, at Bridgeport. I am a practical engineer in woolen, worsted, and cotton machinery. I have been with James Lees & Sons fifteen or sixteen years and had charge of other mills before I went there. I have examined Greaves' reissued patent, 10054, and I understand the invention shown, described, and claimed in that patent. We have that combination of mechanism running on eight of our condenser cards, and we have had it on seventeen. We first put it on in 1870 or 1871. I couldn't fix the date. I would say
it was in 1871; it was before I went home to England. I went
62 there on June 26, 1872, and it was running some time before that. I went to England on a visit at that time. I was away four weeks. I returned to Lees' mills and have been there ever since.

I am thoroughly familiar with condensing carding engines. For many years prior to 1870 all of the elements mentioned in this claim of the plaintiffs' reissued patent were old as applied to con-

densing carding engines, excepting the square shaft. Instead of that we used a round shaft with a steel feather in it.

The difference in operation between such a device having a square shaft and one having a round shaft with a feather is that we get a steadier motion and longer wear with the square shaft.

Q. 2. You have stated the result in the use of a square shaft over a round shaft. Will you please state whether there is any difference between them in principle of operation?

(Objected to as vague.)

A. I don't know as there is. We only put the square shaft in and punched our gear-wheels out to fit the square shafts. All of the other machinery remained the same.

Q. 3. Please look at patent No. 130,344, to A. Worth, and say whether or not you find therein shown and described the combination of mechanism shown in the reissued patent 10054, with the exception of the rub-cylinder.

A. Yes; there is a shaft here working similar to that of Greaves, except that it is triangular instead of square.

Q. 4. State whether or not you find the other elements of that combination shown in the Worth patent except the rub-cylinder.

A. I don't see that there is. I don't know that I do.

63 Q. 5. Do you find in that Worth machine a drive-wheel corresponding to the pinioned wheel of Greaves?

A. I find a wheel driven by a band.

Q. 6. (Witness is shown English patent of 1856, No. 2885, and is asked:) Do you find, on page 6 of the specification and figures 2 and 3 of the drawing, the same combination of mechanism substantially as is shown and described in the plaintiffs' reissued patent, with the exception that the English machine drives a spindle bobbin instead of a rubber cylinder?

(Objected to as leading.)

A. I find a spindle square at one end and a wheel on it similar to what there is on the rubber motion. The bearing is similar to that on the rubber motion. It is a stationary bearing.

Q. 7. Please look at the plaintiffs' reissued patent, No. 10054, and say whether or not there would be any difference in the principle of construction or operation if the shaft were made triangular instead of square.

A. No, sir.

Q. 8. (Witness is shown English patent No. 1247, of 1863, and is asked:) Please look at the drawings annexed to this patent and state what you find therein.

A. I see the front end of a condensing carding engine substantially as we have them now. I see there the combination of a rubber cylinder, its actuating shaft, its bearing, and its gear driving wheel. I also see that the actuating shaft mentioned is a square

64 shaft, because the bearing that the shaft works in is a square bearing, and that is shown at figure 2 of the drawing at the parts marked *m m* and N. This is also plain, because the

carrier-wheel shaft, marked *c*, of figure 2 is shown round, and the same is marked B in figure 1.

Q. 9. Please state whether or not, from an inspection of that drawing without any description, you are enabled to say as a person skilled in the art that the shafts therein shown are square shafts.

A. I am; as they would not put a round shaft in a square bearing.

Q. 10. Looking again at the English patent No. 1247, of 1863, state whether or not you find therein shown substantially the same combination of mechanism claimed in the plaintiffs' reissued patent, No. 10054, sufficiently delineated to enable you to construct and operate the device without the aid of any written description of it.

A. Yes, sir; I do.

Cross-examination by Mr. BUCKLEY:

Q. 11. The square shaft effects also a saving in the wear and tear of the rub-rolls to a greater extent than the old round shafts and feather, do they not?

A. They do.

Q. 12. Does not the square shaft, as it wears upon its four sides in the square hole of the wheel, centre better than the old round shafts and feather?

A. Oh, yes; that is the reason we get a steadier driving.

Q. 13. Does this not result in maintaining the rub-rolls in positions parallel to each other so as to make better work than with the old round shaft and feather?

A. It does.

65 Q. 14. In the Worth patent which was shown to you you do not find any means to rapidly reciprocate the triangular shaft, do you?

A. There is no mechanism shown for reciprocating the shaft. It is simply shown as a sliding and revolving shaft.

Q. 15. You cannot swear positively that the device shown in the English patent No. 1247, of 1863, represents lower reciprocating rub-rolls?

A. Yes, sir; I can.

Q. 16. Please point out how the lower rub-rolls are reciprocated.

A. There is no drawing here to show the eccentric to drive them.

Q. 17. Where do you see a square reciprocating rub-roll shaft?

A. In the parts marked *m m* and N.

Q. 18. The square end there shown you conclude to be a square reciprocating shaft, do you?

A. I do.

Q. 19. Is this not rather a deduction of yours, an opinion, of which you are not positive?

A. It is my opinion that those are square shafts.

Q. 20. If they are square shafts they are out to the full end of their stroke, are they not?

A. By the drawing they are.

Q. 21. Then if they are the upper reciprocating rub-rolls are only at half the extent of their throw, are they?

A. There is no eccentric shown there.

66 Q. 22. What does the eccentric W, in Fig. 1, in your belief, operate—the lower or the upper rub-rolls?

A. I was speaking of the position of the eccentric shown in Fig. 1; that it is on its full throw.

Q. 23. If both of these rub-roll shafts are operated by eccentrics they are likely to be so operated from shaft *l*, are they not?

A. Most likely they would.

Q. 24. There is no other shaft shown to operate eccentrics, is there?

A. I do not see any.

Q. 25. Then if eccentric W, Fig. 1, is at the full extent of its throw on the side of the machine any other eccentric beneath it, on the shaft *l*, which would drive the other rub-rolls of this series, would be, if properly constructed, at the extremity of its throw in the other direction?

A. No, sir; it is not practicable to set it so. The machine would not work steady.

Q. 26. The other eccentric, however, if this one is at the extremity of its throw toward the machine, would show out of line looking down upon it, would it not? I mean that the swell part of the other eccentric—that is, the edge thereof farthest from the driving shaft *l*—would show above the upper edge of the present eccentric W, figure 1, would it not?

A. It would not show the full swell, but would show part of it.

Q. 27. That is, looking straight down upon the two eccentrics, the edge of one would show beyond the edge of the other to the extent of the difference in their throw?

A. If they were both put upon a dead-centre they would
67 both show the full extent of the swell, but it is not practicable to put them so.

Q. 28. In this case, then, in Fig. 1 some of the other eccentric would show looking plumb down upon it?

A. Yes, sir; if the other row of rubs was shown in the drawing.

Q. 29. Don't you find two rows of rubs shown in Fig. 1?

A. No, sir; because it does not show the two shafts of the other rubbers.

Q. 30. What does G, Fig. 1, represent, and what does *g* represent?

A. I can't say without reading the specification. I will look at it. The drawing does not show the connection of shafts with the eccentric.

JOSEPH WADE.

Met, pursuant to adjournment, at office of defendants' counsel this fifth day of October, A. D. 1885, at 3.30 p. m.

Present: Geo. E. Buckley, Esq., for complainants; H. T. Fenton, Esq., for respondents.

JOSEPH LEES, a witness called by defendants, being duly sworn, and examined by Mr. FENTON, did depose and say:

I am one of the defendants in this case. We have woolen mills at Bridgeport, Montgomery county, Pennsylvania. We are manufacturers of cotton and woolen yarns and goods. We have now eighteen condensing carding engines in our mills. Those eighteen condensing cards had the device described and claimed in the plaintiffs' reissued patent, No. 10054, up to about a year ago, when
68 we changed ten of them to another mode. We had fourteen of these engines up to 1877, beginning in 1872. They were all run before May, 1872. The remaining four were put in between 1877 and 1880. We have been using condensing carding engines since March, 1856. As early as 1860 down to 1872 we used condensing carding engines having all the elements of the claim mentioned in this reissued patent, except that we used a round shaft instead of a polygonal-shaped shaft and a bearing to suit a round shaft. A feather was put in the round shaft and a corresponding slot in the bearing, so as to furnish means to drive the shaft. None of those square shafts we have used since 1872 were of cast iron; they were all of wrought iron or steel, and all the bearings were of cast iron. All of these driving shafts must be renewed at times, and we had the shafts made by a machinist—C. Rittenhouse & Son—at Norristown before we had our own machine shop; after that we made them ourselves. We thought by making the shafts square instead of with a feather that they would last longer; would not wear out so soon. It gave a larger bearing. We had no other reason but this. The action of the shaft is the same, round or square, and makes just as good a yarn and does not produce any new effect. The only difference in the square shaft over the round shaft with a feather is that we think that on account of the additional bearing surface in the drive-wheel it wears longer than the round shaft. By a round shaft with a feather I mean what is shown in Figs. 1 and 2 of plaintiffs' original patent, No. 187,620.

Q. 2. Please look at Worth's patent, No. 130,344, of August 6, 1872, and state if you find therein a shaft, C, having a similar motion—that is, revolving and simultaneously reciprocating—as the driving shaft described in plaintiffs' patent.

A. I find that to be the same thing, and I find that shaft to
69 be triangular instead of round or square. I find that it is driven by a drive-wheel embracing the shaft. I find it has a bearing in the drive-wheel corresponding to the shape of the shaft. I find that it covers in all respects what is shown in the plaintiffs' patent claim, and for our purposes I would as soon have it. The bearing surface given by a triangular shaft would be a little more than that given by a square one. When we changed from a round to a square shaft Joseph Wade, foreman of our woolen department, urged us to adopt a triangular instead of a square shaft, saying that a triangular shaft would give a larger bearing than a square one; but we did not adopt his views, because we had put in one experimental square one, and we did not care to make the change.

Q. 3. Please look at English patent of Davidson & Crowther, No. 2885, of 1856, and state whether or not you find in it a spindle having a reciprocating motion simultaneous with its revolving motion, which has a triangular or polygonal end so moving in a like-shaped bearing?

A. I do so find such a spindle, and its operation would be the same if it were a square-shaped spindle instead of triangular. There wouldn't be any difference.

Q. 4. Please look at English patent to Joseph Beaumont, No. 1247, of 1863, and say whether or not you find therein a shaft having an endwise as well as a rotary motion in a corresponding shaped bearing driven by wheels having pinioned periphery.

A. I do so find, and these shafts drive rub-rolls just the same as we are using and as we drive them. I am satisfied that these are square shafts from the ends of them which are shown in figure 1, which I mark A, and also in figure 2, which I mark A, and,
70 comparing these with the stud on the carrier-gear, which I mark B in figures 1 and 2, it is plain, as B shows the round end and A shows the square end. This is also shown in the lower part of figure 2, where the carrier-gear is marked C and the square shaft with its driving gear is marked *m*. This is very plain to me and to any one else familiar with that machinery and carding machinery generally. I am thoroughly familiar with carding machinery, and have had charge of it for nearly thirty years continuously.

Adjourned to Tuesday, October 6, 1885, at 2 p. m.

THURSDAY, *October* 8, 1885—3 p. m.

Meeting pursuant to adjournment.

Present: Geo. E. Buckley, Esq., solicitor for complainants; H. T. Fenton, Esq., solicitor for respondents.

Cross-examination of JOSEPH LEES by GEO. E. BUCKLEY, Esq.:

X Q. 5. When did you first hear of Greaves claiming a square rub-roll shaft?

A. About 1872 or thereabout. It might have been about then. About 1873 I first heard of his taking a patent for it—about his applying for a patent.

X Q. 6. Do you find in the Worth patent referred to by you in your direct examination any rubber cylinder mounted on the polygonal shaft or any means provided whereby the shaft is adapted to be rapidly and continuously reciprocated?

A. I do not see any mechanism on this Worth patent to make the shaft reciprocate rapidly, but it can easily be done, be-
71 cause the slide is there and the hub through which it works. I do not see any rub-roll shaft there. That shaft can be run at any desired speed endways or reciprocating by taking the knife off the end of it.

X Q. 7. Do you find a rub-roll in combination with the square part of the shaft shown in English patent No. 2885, of 1856?

A. I do not.

X Q. 8. Do you find there an upright spindle, square on the end?

A. I do.

X Q. 9. Does the spindle reciprocate?

A. It is free to do so.

X Q. 10. What is the bearing in which the triangular part reciprocates?

A. It is a kind of a square cap.

X Q. 11. Does it revolve this cap?

A. I think it does.

X Q. 12. Are you certain of this?

A. That is my opinion.

X Q. 13. Can you point out in the specification the part which indicates that this cap revolves?

A. I think that it is driven by the band shown on the drawing.

X Q. 14. Looking at English patent No. 1247, of 1863, what makes you conclude that that square end indicates a square shaft?

A. Because the drawing shows it.

72 X Q. 15. Which figure in the drawing shows it?

A. The lead-pencil letters A *a* show a square shaft, and B shows a round shaft. The square shaft shows the same as two corners, while the round shows no corners. This is where the gears are off. Where the gears are on it shows a square roller above the gear.

X Q. 16. Which have the square shafts—the upper or lower rub-rolls?

A. The lower ones.

X Q. 17. Where do these square shafts terminate at their inner end?

A. That is not shown in the drawing or described in the patent. I do not see it.

X Q. 18. What are the means shown to reciprocate the upper rub-rolls in this drawing?

A. That is shown in figure 3 to be an eccentric, which is marked W.

X Q. 19. How are the lower rub-rolls reciprocated?

A. The same as the upper—by an eccentric, marked W.

X Q. 20. Looking at figure 1, do you not see an eccentric, W, in plan view?

A. Yes, sir.

X Q. 21. That reciprocates the upper rub-rolls, does it not?

A. Yes, sir.

X Q. 22. It is at the extent of its throw toward the body of the machine, is it not?

A. Yes, sir.

X Q. 23. It is driven by the shaft *l*, is it not?

A. Yes, sir.

73 X Q. 24. If the eccentric which drives the upper rub-rolls is at the extent of its throw on the side toward the machine, would not the eccentric which drives the lower ones, if there were such, be at or near the extent of its throw at the side away from the machine, both eccentrics being driven by the shaft *l*?

A. Nearly so.

X Q. 25. Then would not the edge of the lower eccentric show beyond the edge of the eccentric shown in figure 1 on the side away from the machine looking down upon them?

A. No, sir; I cannot see any sign of any other mechanism actuating the lower rubbers.

X Q. 26. You do see in figure 1 two sets of rubbers, one above the other?

A. I do.

X Q. 27. The upper one is shaded so as to show the lower one, is it not?

A. Yes; but there is no mechanism shown to reciprocate the upper rubbers.

X Q. 28. Then you mean that the eccentric shown in figure 1 simply reciprocates the lower set of the rub-rolls there shown?

A. Exactly.

X Q. 29. And there is no means there shown of reciprocating the upper set?

A. No; but there is in figure 3.

X Q. 30. Then in your opinion they have shown the top hamper of this machine in all respects, excepting the upper eccentric and the shafts from the upper rub-rolls leading in the general direction of the eccentric—that is, in figure 1?

A. They have shown the eccentric belonging to the upper set. I made a mistake when I said the lower set before.

74 X Q. 31. Then what does that eccentric, W, in Fig. 1 drive?

A. It drives the upper set.

X Q. 32. Then if the eccentric which drives the upper set is at the extent of its throw on the side toward the machine, you have already answered that the eccentric when it drives the lower set would be at or near the opposite extremity of its throw?

A. Yes, sir.

X Q. 33. Then would not the large bulge of the lower eccentric show out beyond this upper eccentric, *l*, looking down upon them, as shown in Fig. 1, on the side away from the machine?

A. I do not think it would.

X Q. 34. Then how would the eccentrics which are supposed to reciprocate these rub-rolls and rub them one upon the other in different directions operate to produce that result if they were both at the extent of their throw in the same direction at the same time?

A. They would not rub the slubbing or sliver at all that way.

X Q. 35. Then if they are not at the extent of their throw in the same direction at the same time, both being mounted upon the same shaft, how do you account for the narrow space upon the upper eccentric not exposing, at least, part of the lower eccentric?

A. I do not think that they throw out far enough to be shown in a draft like that.

X Q. 36. If it were correctly drawn do you think that the lower eccentric would show as I have mentioned in Fig. No. 1?

A. I do not think it would be shown in a drawing like that.

75 X Q. 37. If a drawing is correctly made, then, and two eccentrics are of the same size, one directly beneath the other, the upper one is at the extent of its throw on the side of the machine, as shown in Fig. 1, and the two are designed to simultaneously reciprocate upper and lower rub-roll shafts in different directions, you think that the upper one, looking plumb down upon them, will entirely hide the lower one?

A. In the machine, looking plumb down upon them, the lower one will show, but I do not think it will in a drawing if correctly made.

Re-examination by Mr. FENTON:

Q. 38. If, as a practical carder, you were told that in a condensing carding engine the "slubbing was passed between a series of pairs of rollers and rubbers in which certain of the rollers act as bottom rollers and rubbers and the other rollers act as top rollers and rubbers," what motions would you understand that the top and bottom rollers respectively had in such an arrangement of mechanism?

(Objected to, as the witness has not been shown to be an expert in interpreting the language of claims and drawings of specifications of patents and descriptions of machinery.)

A. I would say that they both had a rotary and reciprocating motion.

Q. 39. Is it possible for such a roller as is shown in the Beaumont patent, both upper and lower rollers, to act as rub-rolls unless they had a reciprocating motion?

(Same objection.)

A. I think that it would be possible to be a rubber without having a reciprocating motion. If the bottom only had a rotary
76 motion the top could slide over it and do the rubbing—that is, where the top roller was reciprocating—but in such a case it would only do half the work they would when both reciprocated.

Q. 40. If you were told that both the upper and lower rollers in the Beaumont patent were rubbers, would you understand that both reciprocated?

(Objected to as leading.)

A. I don't know as I would by them using the word "rubber."

Q. 41. Question repeated.

(Objected to as already answered.)

A. Of course we would to-day, but twenty or twenty-five years ago we used to use the lower ones with simply the rotary motion.

Q. 42. If you were informed that in the Beaumont drawings the top rollers were rollers and rubbers and the bottom rollers also acted as bottom rollers and rubbers, would you understand that both top and bottom rollers reciprocated?

(Objected to as not proper redirect, as already answered, and leading.)

A. I would think that both upper and lower rubbers had a reciprocating motion. I take that for granted, because they both are described as rubbers and rollers.

Q. 43. If you were informed that the two sets of rollers "acted uniformly and simultaneously," would this information confirm the opinion stated in your last answer?

(Same three objections repeated.)

A. It would.

77 Q. 44. If you were informed from the Beaumont patent "that these rollers work one over the other," drawing the slubbing between them, which, at the same time, undergoes the process of rubbing by means of the same rollers, "to which an end-way reciprocating motion in the direction of their axis will be communicated while they are rotating on their axis," would you understand from that that both upper and lower rollers reciprocated?

(Same objections repeated and as calling for the witness' inferences.)

A. I would.

Adjourned to Monday, October 12, 1885—3 p. m.

PHILADELPHIA, *October* 12, 1885.

Meeting pursuant to adjournment.

Present: Geo. E. Buckley, Esq., solicitor for complainants; H. T. Fenton, Esq., solicitor for respondents.

Recross-examination of JOSEPH LEES by Mr. BUCKLEY, *de bene esse:*

X Q. 45. If the lower roller simply has a rotary motion, and the upper one has both a rotary and reciprocating motion, are they not, nevertheless, both rubbers?

A. Yes, sir; they are.

JOSEPH LEES.

Sworn and subscribed before me—

FRANCIS S. BROWN, *Examiner.*

Adjourned to Tuesday, October 13, 1885, at 4 p. m.

78 Meeting Monday, February 22, 1886, at 11 a. m.

Present: Mr. Buckley, for complainants; Mr. Fenton, for defendants.

CHARLES A. FURBUSH, a witness called on the part of defendants, being duly sworn, and examined by Mr. FENTON, testified:

Q. 1. Please give name, age, residence, and occupation.

A. Name, Charles A. Furbush; age, 41; residence, No. 1317 Green street, Philadelphia; occupation, builder of woolen machinery.

Q. 2. Have you ever at any time been engaged with Mr. M. A. Furbush, of Philadelphia, and are you familiar with machinery for carding wool?

A. I have so been engaged and am familiar with such machinery.

Q. 3. Please look at copy of plaintiffs' letters patent, No. 10054, and state whether or not you understand the mechanism therein shown, described, and claimed.

A. I do understand the mechanism therein shown.

Q. 4. Have you ever seen in operation any mechanism such as therein shown and described? If so, please state each and every, if more than one, object accomplished by making the shaft square or polygonal instead of round.

A. I have seen this in operation. The object accomplished in making it square was to have four sides instead of one for turning the rub-roll *instead of one*, as with the feather—that is, four wearing surfaces.

79 Q. 5. Please look at plaintiffs' original patent, No. 187,620, Figs. 1, 2, and 3, and state whether or not those figures referred to in the question illustrate what you meant in your last answer by a round shaft with a feather.

A. Yes, sir; that is what I referred to.

Q. 6. In such machinery is there or not any result obtained, other than increased wear by reason of increased bearing surface, by making the shaft square or polygonal over making it round with a feather, as shown in No. 187,620, or two feathers on opposite sides of the shaft?

A. None at all.

Q. 7. Please look at the letters patent to A. Worth, No. 130,344, and state whether or not you find therein described a simultaneously sliding and revolving shaft supported and so operating in a tubular shaft of similar form.

A. I do.

Q. 8. As you understand that Worth patent, state whether or not the triangular shaft C has a similar or a different motion or motions in its tubular bearing shafts from the motions of the square shaft X in the hub of the pinion A, shown and described in the plaintiffs' reissue, No. 10054.

A. It is the same.

Q. 9. Please look at English letters patent No. 1247, dated May 18, 1863, to Joseph Beaumont, and state whether or not you have read the same and understand the mechanism therein shown and described.

A. I have read it and do understand it.

Q. 10. Please state whether or not you find in that English patent mechanism substantially the same in combination, construction, arrangement, and operation as the mechanism shown,

80 described, and claimed in the plaintiffs' reissued patent, No. 10054; and, if so, please state the reasons on which you base your answer.

A. I do find the same thing, and I base my answer upon the sketch or drawing.

Q. 11. Do you find in the specification accompanying that patent a description of the operation of the several parts constituting the condensing mechanism?

A. I do.

Q. 12. And does that operation as therein described differ in any material respect from the operation of the plaintiffs' mechanism as described in his reissued patent, No. 10054?

A. It does not?

Q. 13. With that English patent of Joseph Beaumont before you, if you, as a person skilled in the art to which that mechanism belongs, was requested to construct machinery such as therein described and shown, of what shape would you construct the shaft which operates the rub-rolls?

A. I would make them square.

Q. 14. State whether or not the drawing alone, in addition to the description of the construction and operation of the other parts of the mechanism, is sufficient to convey this information to your mind.

A. It is.

Q. 15. Please look at the drawing annexed to Beaumont's English patent and identify by letters in figures 1 and 2 the shafts and rub-rolls referred to.

A. Those marked A in figure 1 are the square shafts that I refer to, and in figure 2 the rub-rolls are lettered A.

81 Q. 16. In looking at figure 1 of Beaumont's patent what is the mechanism marked B?

A. It represents a round shaft for conveying motion to the square shaft through the gear-wheels *c* and *m*.

Q. 17. Is there anything to indicate in figure 1 of Beaumont's patent on the drawing alone that the shaft B is round?

A. The shading of the drawing represents it as being round.

(Objected to as leading.)

Q. 18. And in like manner does the absence of shading of shaft A in figure 1, in addition to the cross-section thereof in figure 2, indicate that shaft to be square?

(Objected to as leading.)

A. It does.

Q. 19. As one familiar with this subject-matter, state whether or not there is any difference in principle of construction and operation between a square shaft and one that is triangular or in any other form of polygon in such a combination of mechanism as shown and described in plaintiffs' reissue, No. 10054.

A. None whatever.

Q. 20. If the shaft X of the plaintiffs' patent was made round, with four feathers in positions corresponding to the four angles of the square, would you say that there would be any appreciable—greater or less—wear in such a shaft over one that was square like the shaft X?

A. I should not.

Q. 21. Have shafts been constructed with more than one feather?

82 (Objected to as leading and as calling for defense not set up in the answer.)

A. There have been.

Cross-examination by Mr. BUCKLEY:

X Q. 22. You are a builder of textile machinery, are you not?

A. I am.

X Q. 23. You have built carding machines with square rub-roll shafts and furnished carding machines with square rub-roll shafts in Philadelphia since March 7, 1882, have you not?

(Objected to as not cross-examination.)

A. I don't think that I have.

X Q. 24. In the interference case which took place in the Patent Office between Greaves and Stone you appeared as a witness for Stone, did you not?

(Objected to for reasons as above.)

A. I think I did.

X Q. 25. Do you find in the Worth patent referred to by you in your direct examination any rubber cylinder mounted on a polygonal shaft or any means provided by which the shaft is adapted to be rapidly and continuously reciprocated?

A. I do not.

X Q. 26. Looking at English patent No. 1247, of 1863, what leads you to the conclusion that the square ends indicate square shafts therein?

A. The shading of the spindles on the ends of the rub-rolls indicate it, as well as the holes in the gears through which they vibrate show them to be square.

83 X Q. 27. Please mark with an *x* that shading on the spindle on the end of the rub-rolls which indicates a square shaft.

A. The witness marks the drawing as requested.

X Q. 28. Do you not observe that the part which you have marked only has the appearance you refer to outside of the hub of the outer wheel?

A. That is all; but it could not go through the gear-wheel of any other shape except being entirely round, for which there would be no object gained.

X Q. 29. Do you not observe that these shafts immediately inside of the hubs of said wheels are all shaded round? I mean the part marked V.

A. That may be the hub of the wheel. It does not show the shaft. I am of the opinion that is the hub of the wheel; otherwise there would be nothing to support the wheel *m*.

X Q. 30. If V is the hub of the wheel, what is W?

A. It is a part of the hub.

X Q. 31. Then do you suppose that V is hollow?

A. I do.

X Q. 32. And do suppose also that this hollow hub extends all the way into the rub-roll?

A. I do not.

X Q. 33. That round formation, however, by the drawing seems to extend all the way into the rub-roll, does it not?

A. From the appearance of the drawing it does.

X Q. 34. It seems to come out at the other end of the rub-rolls, too, does it not?

A. It does.

84 X Q. 35. Then you would infer that the hollow hub of that outer wheel *m* extends through the whole length of the rub-roll to the frame which imparts reciprocating motion?

A. No; I would not.

X Q. 36. Where does this hub close, then, according to this drawing?

A. It is an imperfectly made drawing, but I would infer that it ceased before reaching cog-wheels *r*. I don't know whether those *r's* are cog-wheels or what they represent.

X Q. 37. What are the round ends *f g h* on this drawing?

A. I should judge they were bearings for the top rub-rolls.

X Q. 38. Then if the top rub-rolls reciprocate do not the wheels *r r r* sustain the shafts of the top rub-rolls, which are round, and these small cogs reciprocate on the long drums *p p*?

A. I should say they did.

X Q. 39. Then these top rub-rolls which reciprocate do not have any square ends, do they?

A. The drawing does not represent them as being square.

X Q. 40. Is there any provision here shown for reciprocating the lower rub-roll shafts marked E F G H?

A. There is. Figure 3 represents that; figure 1 also. There is an eccentric, W.

X Q. 41. Then, in your opinion, both the upper and lower rub-rolls, *f* and F, reciprocate?

A. I should say they did.

X Q. 42. The throw of eccentric W is at its utmost toward the side of the machine, is it not?

A. Yes; its greatest throw is nearest the machine. It is at the utmost of its throw in that direction.

85 X Q. 43. All these eccentrics are mounted on the shaft *l*, are they not?

A. They are.

X Q. 44. If the eccentric W is at the utmost of its throw toward the machine, then the eccentric below, which reciprocates the lower rub-roll shafts, should be at the extent of its throw in the opposite direction and away from the machine, should it not?

A. It should.

X Q. 45. This being the case, if the lower rub-rolls, E F G H, reciprocate, looking down upon these eccentrics from above, the lower eccentric should show from the outside below the eccentric W?

A. It should.

X Q. 46. No such showing occurs here, does it?

A. It does not.

X Q. 47. Then would you not infer from this that the lower rub-rolls do not reciprocate?

A. I would.

X Q. 48. And you would infer also, then, that these square ends must belong to the lower rub-rolls—do not reciprocate in their bearings in the hubs?

A. I should infer that they belong to the lower rub-rolls in Figs. 1 and 2, but on Fig. 3 I should judge that each tier of rub-rolls was moved by an eccentric.

X Q. 49. Then you only infer from Fig. 3, possessing what appear to be four eccentrics, that each tier of rub-rolls is reciprocated?

A. I infer from Fig. 3 of the drawing, and also from the specification.

86 X Q. 50. Point out that part of the specification which says that the lower rub-rolls are reciprocating.

A. On page 5 it mentions four eccentrics, and, as there are four tiers of rub-rolls, I infer that each eccentric moves one tier.

CHAS. A. FURBUSH.

Sworn and subscribed before me this twenty-second day of February, A. D. 1886.

FRANCIS S. BROWN, *Examiner.*

87 DEFENDANTS' EXHIBIT 9.

*Specification.*

A. D. 1856. No. 2885.

Winding machines.

Letters patent to Robert Davison and Joshua Crowther, Lansdowne spinning and weaving factories, Limerick, for the invention of "improvements in machinery for winding yarns or thread on bobbins or pirns fixed on spindles driven by gear or cogged wheels and for winding weft for either hand or power looms."

Sealed the 5th June, 1857, and dated the 5th December, 1856.

Provisional specification left by the said Robert Davison and Joshua Crowther at the office of the commissioners of patents with their petition on the 5th December, 1856.

We, Robert Davison and Joshua Crowther, of Lansdowne spinning & weaving factories, Limerick, do hereby declare the nature of the said invention for "improvements in machinery for winding yarns or thread on bobbins or pirns fixed on spindles driven by gear or cogged wheels and for winding weft for either hand or power looms" to be as follows:

The using of a collar or socket revolving in a stationary bearing or bearings with a mitre, a spur, a bevil or skew geared wheel fixed

or keyed on it, working into another wheel, with gear to match,
88 keyed or fixed on a line shaft, which is driven by the motive power. At one end of the said collar or socket there are clutches or jaws, which, fitting into similar ones on what is called the clutch-box, makes it revolve while in hold with the collar.

The spindle runs through and turns freely in a round hole passing through the centre of the collar and of the clutch-box in the line of their axis. A certain length of the spindle, about equal to the parallel part of the bobbin or pirn, is made square or has a projection on it, which, fitting into a correspondingly shaped hole in a small plate secured on the top or end of the clutch-box, makes the spindle revolve with the clutch-box and collar as long as any part of the square or projecting part of the spindle is in the shaped hole on top or end of clutch-box. The pirn or bobbin is attached in the usual manner to the top or head of spindle, and is pressed against the "cup," which regulates the size and shape of the cone or mass of yarn wound on the pirn, either by a lever with counterpoise weight, by a line or chain passing over a pulley with a weight attached, or by a crank and weight, or by a spring.

As the yarn is being wound on the pirn — fills up the cup the spindle is gradually forced through the clutch-box and collar till the entire of the squared or projecting part has passed through the fitted hole on top of clutch-box, when the spindle will cease to revolve. The square or projection on spindle is so placed on it that when the pirn has received its full quantity of yarn or thread the entire of the square or projecting part will have just passed through the fitted hole on clutch-box.

The motion of the spindle is stopt either by removing the cup, when the pressure on its opposite end will force all the squared or projecting part through and clear of the fitted hole
89 on clutch-box, or by lifting or removing by hand or by lever the clutch-box clear from the collar, or when the pirn or bobbin has received its full and proper quantity of yarn or thread.

Specification in pursuance of the conditions of the letters patent filed by the said Robert Davison and Joshua Crowther in the Great Seal Patent Office on the 5th June, 1857.

To all to whom these presents shall come we, Robert Davison and Joshua Crowther, Lansdowne spinning and weaving factories, Limerick, send greeting:

Whereas her most excellent majesty Queen Victoria, by her letters patent, bearing date the fifth day of December, in the year of our Lord one thousand eight hundred and fifty-six, in the twentieth year of her reign, did for herself, her heirs and successors, give and grant unto us, the said Robert Davison and Joshua Crowther, her special licence that we, the said Robert Davison and Joshua Crowther, our executors, administrators, and assigns, or such others as we, the said Robert Davison and Joshua Crowther, our executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term

therein expressed, should and lawfully might make, use, exercise, and vend within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man an invention for "improvements in machinery for winding yarns or thread on bobbins or pirns fixed on spindles driven by gear or cogged wheels and for
90 winding weft for either hand or power looms," upon the condition (amongst other things) that we, the said Robert Davison and Joshua Crowther, our executors or administrators, by an instrument in writing under our or their or one of their hands and seals, should particularly describe and ascertain the nature of the said invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said letters patent:

Now know ye that we, the said Robert Davison and Joshua Crowther, do hereby declare the nature of our said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the sheet of drawings hereunto annexed and to the letters and figures marked thereon (that is to say):

Our invention relates to apparatus or machinery for filling or winding yarns or thread on shuttle or other bobbins or pirns, and consists in the particular arrangement and construction of the spindles upon which the bobbins or pirns are placed when being filled, and the parts in connection with such spindles, whereby they are driven or their motion suspended, for the purposes and as hereinafter described.

The spindles may be driven by spur, bevil or skew toothed gearing, or by other suitable means, while at the same time and by means of our improvements the motion of the bobbin spindle is suspended by the self-action of the machine when a sufficient quantity of thread or yarn is wound upon it. The spindle also remains stationary while the bobbin is being removed or while joining
91 a broken thread, although the driving gear at all times continues in motion. For this purpose we employ a spindle, which is free to rise and fall, as ordinary spindles used for the purpose, and upon the top of which the bobbin is placed to be filled. The spindle rests on a step at the lower part, which has a constant tendency to rise, but the spindle is held down by an inverted conical cup bearing upon the conical part of the bobbin and on the thread as it is wound thereon, which, as regards its general principle, is as usual in such machines.

We place each bobbin spindle within a socket piece, which takes a bearing in the upper and lower spindle rails. The driving wheel is fixed upon the socket, and the spindle is of itself free to slide lengthways and to revolve within this driving socket. The upper part of the socket is fitted with a cap-piece, which rests on a flanch formed on the socket, and is carried round with it by means of a pin projecting above the flanch and received into the cap piece, or it may be any other suitable clutch-piece. The upper part of this cap has a square hole in it, through which the upper part of the bobbin

spindle passes freely. This upper part is round, and is not at all affected by the motion of the socket and cap. Immediately below this round part a square part is formed on the spindle, which is free to slide through the square hole in the cap, but which causes the spindle to rotate with it. The lower part of the spindle (which is fitted to the socket) is of a diameter greater than that of the square taken at the angles, which is therefore freely received within the same socket. The action is thus: When the bobbin has a sufficient quantity of thread or yarn wound upon it the spindle descends so far, by the pressure of the cap upon the bobbin, that the square part passes entirely within the driving socket, which then rotates
92 without the spindle, and consequently suspends the further winding of the yarn on the bobbin. Again, when the bobbin is about to be removed or the broken thread pieced the conical pressure cup is removed by turning it on one side, which allows the spindle free liberty to rise, which it does by the action of the rising step, until it brings the large round part of the spindle up against the socket cap, which it lifts and removes from contact with the pin or clutch of the socket flanch. The spindle then remains stationary.

*Description of Drawings.*

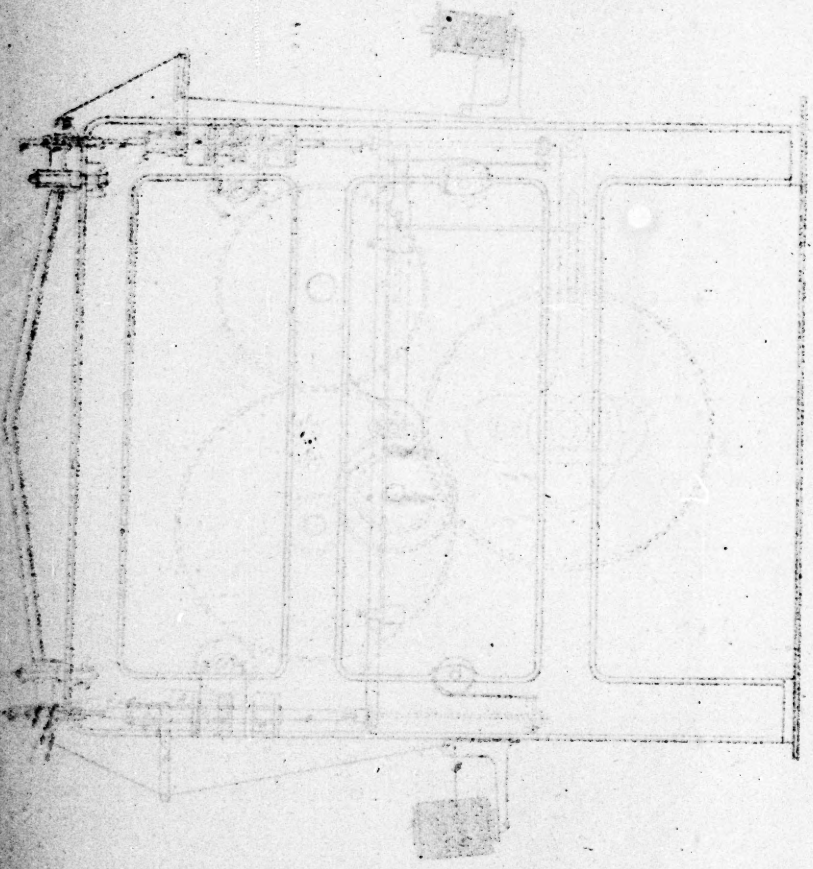
Figure 1 represents an end view of a machine having the spindles arranged and constructed according to our invention, while figures 2, 3, and 4 represent the parts in detail on an enlarged scale; figure 2 represents a detached view of the spindle and its accessories arranged according to our invention, showing the bobbin in position when empty; figure 3 represents the same after the bobbin has been filled, or, in other words, with a sufficient quantity of the yarn or thread wound upon it, while figure 4 represents the same with the conical cup removed or turned aside, allowing the socket cap to be lifted out of gear from the driving clutch or flange of the spindle socket, which receives the motion from the driving gear.

A $A^1$ are the rails of the machine supporting the several bobbin spindles, which in figures 2, 3, and 4 are represented in transverse section, which is also the case with reference to the several parts for transmitting the motion to the spindle in order that the different positions of the spindle B B and the effects produced by those different positions may be distinctly shown. The socket piece or tube
93 C C is fitted in bearings in the rails A $A^1$, and rests on the upper rail by means of a projecting flanch, $C^1$. This socket is truly bored to receive the spindle B B, which from 1 to 2 is cylindrical, so that it may slide freely within the socket C or remain stationary while the socket rotates, which it does constantly by reason of the skew-toothed wheel F being keyed or otherwise fixed upon the socket C and gearing with the toothed wheel $F^1$ fixed on the horizontal shaft P, which receives motion from the driving power. The spindle B B from 2 to 3 is formed rectangular, of such size as will easily pass within the socket C C, while the upper part of the spindle from 3 to 4 is cylindrical and of a diameter less than the side of the square from 2 to 3. The upper part of the socket C is

furnished with a cap, D, which is truly bored and fitted to the exterior of the socket piece C, which is of a cylindrical form. The top of this cap piece consists of a plate, $D^1$, fixed thereto, and having a square hole through it fitted to receive the square part of the spindle from 2 to 3, which slides freely therein, and when the cap piece rotates it carries the spindle round with it. The flange $C^1$ is furnished with a projecting pin, E, which is received into a hole, G, formed in the upper part of the cap piece D, so that when the cap piece D is free to rest on the flange $C^1$ the pin E enters the hole G and causes the cap D to participate in the rotary motion of the socket C. I is the conical cup which bears on the bobbin or pirn K K and on the thread or yarn wound thereon, and gradually forces down the bobbin spindle B as the bobbin becomes filled. This cup I is carried by the top rail L and fitted on a pin fixed therein, on which it may be turned round and out of contact with the bobbin K, as seen in figure 4. This part, together with the traversing rod M, for delivering or conducting and distributing the yarn on the
94 bobbin, will be readily understood as being of the ordinary character used in machines for filling shuttle bobbins.

The spindle B B rests at the foot on a step carried by the lever H, which has a counter-balance weight regulated to give the spindle a sufficient ascending power for the purpose required.

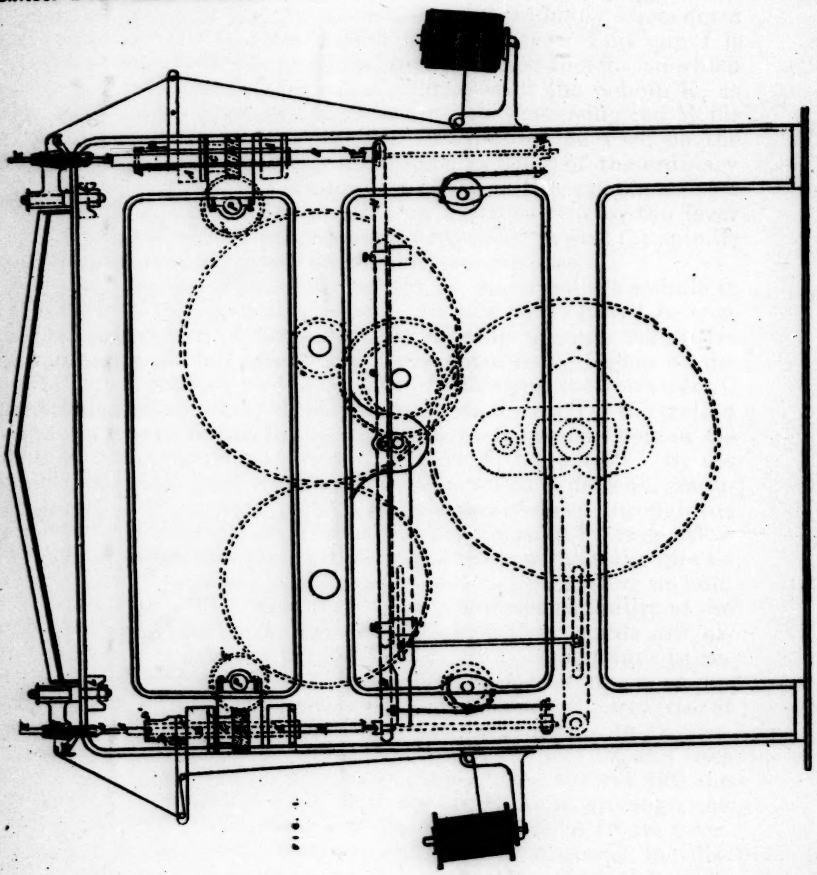
Figure 2 represents an empty bobbin, K, placed on the spindle to be filled, with the cup I in position. In this figure it will be seen that the square part of the spindle has risen up through the square hole to nearly the full extent, and is prevented rising higher by the conical cup I pressing on the bobbin. In this position the socket C communicates motion by its clutch from E to the cap D; the motion of the cap is transmitted to the spindle B by the square hole in the plate $D^1$ taking effect on the square part of the spindle. By the winding on of the yarn the spindle will be caused to descend, gradually carrying the square part of spindle slowly down through the square hole in the plate $D^1$, until ultimately the point 3 passes below the plate $D^1$, when that plate will be free to rotate without the spindle B by means of the small round part from 3 to 4 presenting no hold for the plate $D^1$. This takes place when a sufficient quantity of the yarn has been wound on the bobbin, which then stands still, although the other parts of the machine continue in motion. In removing the full bobbin from the spindle to replace it by an empty one, the cup I is turned on one side, so as to allow the free rise of the spindle B, which then ascends, as seen in figure 4. In this ascent the square part of spindle enters the square hole $D^1$, and rises till the point 2 comes in contact with plate $D^1$, and thereby lifts the cap D until the hole G is freed from the pin E; thus, although the square part of spindle and the square hole in $D^1$ are inter-
95 locked, the spindle remains stationary by reason of the disengaging of the clutch pin E, and thereby affords the necessary facility for removing the full bobbin and replacing it by an empty one. By this same arrangement and proceeding the bobbin may be stopped at any time for uniting the thread when it breaks, or for any other purpose.



No. 331.
Dobinson
v.
Lees } p. 96

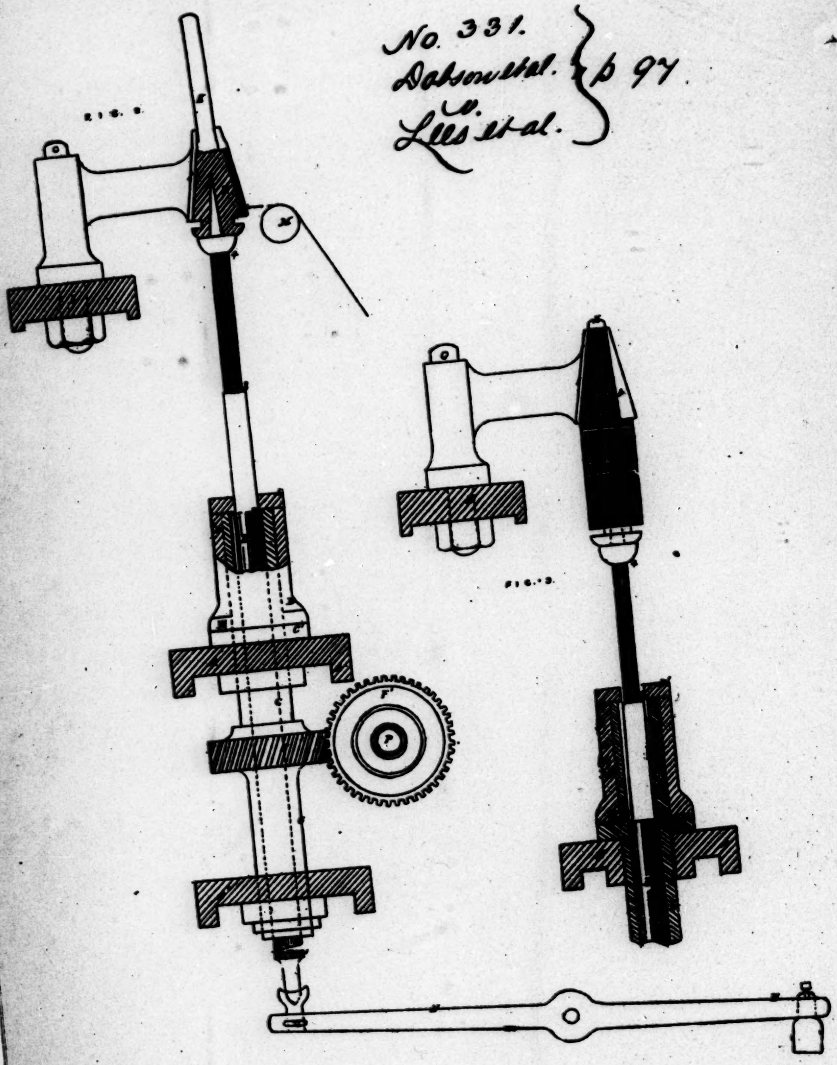


A.D. 1856. Dec. 5. No 2885.
DAVISON & CROWTHERS Specification

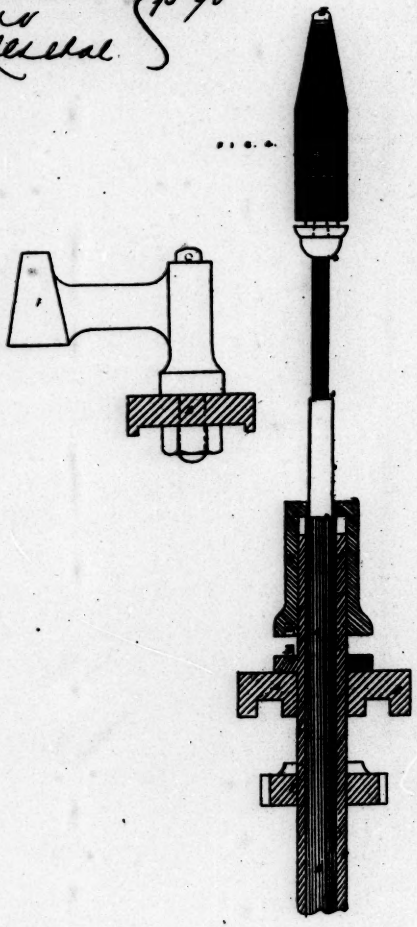


97

No. 331.
Dahmwetal. } p 97.
Lee et al.



No. 331.
Absorbital
&
Lecithal
} p 98



Although we have described the part of the spindle from 2 to 3 as being square in its horizontal cross-section, a triangular or any other form may be adopted which will afford the same capabilities; any other form of clutch may also be substituted for the pin E without departing from our invention, and instead of the skew driving gear F $F^1$, represented, any other suitable toothed bevel or other gear may be employed.

Having described the nature of our invention and the manner of carrying the same into effect, we wish it to be understood that what we claim as of our invention, intended to be secured by the hereinbefore in part recited letters patent, is the arrangement and combination of parts in connection with spindles driven by toothed or other gearing for filling or "winding on" yarn or thread on shuttle or other bobbins or pirns, whereby the rotary motion of the spindle is communicated or suspended, for the purposes and as hereinbefore described.

In witness whereof we, the said Robert Davison and Joshua Crowther, have hereunto set our hands and seals this first day of June, in the year of our Lord one thousand eight hundred and fifty-seven.

(Signed) ROBERT DAVISON. [L. S.]
JOSHUA CROWTHER. [L. S.]

(Here follow diagrams marked pp. 96, 97, & 98.)

99 DEFENDANTS' EXHIBIT 8.

UNITED STATES PATENT OFFICE.

ALBIN WARTH, of Stapleton, New York.

*Improvement in Cloth-Cutting Machines.*

Specification forming part of Letters Patent No. 130,344, dated August 6, 1872.

To all whom it may concern:

Be it known that I, Albin Warth, of Stapleton, in the county of Richmond and State of New York, have invented a new and improved machine for cutting textile and other material; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a sectional side view of this invention. Fig. 2 is a vertical section of the cutting mechanism in the plane *x x*, Fig. 1. Fig. 3 is a horizontal section of the same in the plane *y y*, Fig. 1. Similar letters indicate corresponding parts.

This invention consists in the combination of a rotating knife with a throat-plate containing a knife-receiving socket, and with a sliding and revolving shaft in such a manner that by the sliding and

revolving shaft a rotary motion is imparted to the knife, and at the same time the knife and throat-plate follow the sliding motion of said shaft; and, besides this, those parts have an independent rotating motion round an axis at right angles to the sliding and rotating shaft; further, in combining with the throat-plate,
100 the rotating knife, and the sliding and revolving shaft a standard which carries a handle and rises from the throat-plate and forms the bearings for the spindle of the knife, while its upper portion is round and fitted into two sleeves, one inside the other, the first sleeve carrying a double cog-wheel that serves to transmit the rotary motion from the sliding and revolving shaft to the rotating knife, while the second sleeve forms the support for one end of the sliding and revolving shaft in such a manner that the throat-plate, together with the rotating knife, can be turned round in either direction without being thrown out of gear with the sliding and revolving shaft, while at the same time the sliding motions of said shaft are transmitted to the cutting mechanism; also in the arrangement of a sectional double cog-wheel, in combination with the throat-plate, the rotating knife, and the sliding and revolving shaft, in such a manner that said cog-wheel, can be readily adjusted to knives of different diameters, and that when the knife wears off and has to be moved close to the throat-plate the double cog-wheel can be adjusted accordingly; further, in combining with the rotating knife, the throat-plate, and the sliding and rotating shaft an automatic feed-receiving motion from the spindle of the rotating knife in such a manner that the material to be cut can be fed automatically toward the rotating knife, or that the rotating knife, together with the throat-plate, can be fed toward the material to be cut; also in the arrangement of a sharpening stone or other sharpening device in the side of or connected to the feed-wheel, said sharpening stone being made to act on the side of the rotating knife in such a manner that, as said knife revolves, its cutting edge is continually kept sharp, and at the same time, by the motion of the feed-wheel, a constantly varying surface of the sharpening stone is presented to the knife.

101 In the drawing the letter A designates a table, from which rises the swivel head B, which supports the sliding and revolving shaft C. Said swivel head consists of a tubular standard, *a*, which is provided with a bottom flange, *b*, to fit into a grooved bracket, *c*, which is firmly secured to the table A, the tubular standard being free to rotate in said bracket. In the mouth of the tubular standard is fitted a plate, *d*, which swings between center points *e*, and from which rise two standards, *f*, that form the bearing for a tubular shaft, *g*. By means of the center-points *e* this shaft can be swung up or down, or brought in any desired inclination toward the table A, while the tubular standard *a* allows the same to turn freely in either direction in a plane parallel to the surface of the table. On the tubular shaft *g* is mounted a pulley, *h*, which connects by a belt, *i*, with a pulley, *j*, mounted on the driving shaft D, that has its bearings in boxes secured to one of the legs of the table A, and which receives motion by a hand-crank, or by a treadle, or

by any other suitable means. The pulleys *h* and *j* are grooved, so that when the standard *a* is turned around the belt *i* will not be thrown off. The tubular shaft *g* is bored out to receive the sliding shaft C, which is, by preference, made triangular, but which may be formed in any desirable manner, so that it will not turn in the tubular shaft, while it is free to slide therein. The sliding motion of the shaft C is facilitated by friction rollers *k*, which project through the sides of the tubular shaft *g*, and bear from different sides against the sliding shaft C. One end of said sliding shaft is turned off round, and it has its bearings in a bracket, E, which extends from a sleeve, F, fitted on the cylindrical rod G. This rod is supported by a standard, I, which rises from the throat-plate J, said standard be-
102 ing provided with a flange, *l*, shown in Fig. 2 and in Fig. 1 in dotted lines, that is provided with a hole to receive the rod G. On the flange *l* rests a double cog-wheel, K, which is dropped loosely on the rod G beneath the sleeve F, said sleeve being bored out to receive the tubular hub of the cog-wheel. Said cog-wheel is provided with teeth on its upper and also on its lower surface, and it is made in two sections which fit into each other like telescope tubes, so that by drawing the inner section out, the distance between the upper and the lower set of cogs can be increased, and *vice versa*. The two sections of the cog-wheel K are secured in the required position by set-screws $a^2$. The upper cogs of said cog-wheel gear into a pinion, *m*, mounted on the end of the sliding shaft C, inside of the bracket E, said shaft being prevented from sliding by the pinion on one and by a screw ring, *n*, on the other side of said bracket. The lower set of cogs of the cog-wheel K gears into a pinion, *o*, which is mounted on a shaft, *p*, that has its bearings in a bracket, *q*, extending from or forming a part of the standard I of the throat-plate. On this shaft is also secured the circular disk knife L, and as the sliding shaft C is revolved a rotary motion is imparted to the disk knife. The cutting edge of the knife co-operates with a cutting edge formed on the side of the throat *v* in the throat-plate J. From the bracket *q*, which supports the shaft *p*, extends an arm, *w*, which may serve as the handle for guiding the mechanism during the operation of cutting; or, if desired, an additional handle, *w**, may be secured to the upper end of the rod G. (See Fig. 2.) On one side of the arm *w* is placed a lever, $a^1$, which has its fulcrum on the shaft or spindle *p*, and in which is secured a pin, *g*, that forms the bearing for the feed-wheel *h'*. On the inside of this feed-wheel is fastened a
103 cog-wheel, *b*, which is geared by an intermediate pinion, *c'*, with another pinion, *d'*, mounted on the spindle *p*, so that said feed-wheel receives a continuous revolving motion in the same direction with said spindle. A spring, *h'*, which acts on the lever $a^1$, serves to depress the feed-wheel toward a serrated wheel, *l'*, which is mounted in the throat-plate. As the spindle *p* revolves a constant rotary motion is imparted to the feed-wheel *h'*; and if the material to be cut is placed beneath the feed-wheel and held stationary, the cutting mechanism is fed automatically toward said material, the throat-plate J being placed beneath it, so that by the co-operation of the cutting edges of the revolving knife and of the throat-plate

the cutting is effected. The throat-plate may be constructed with one or more caster rollers on its bottom surface, so that it will move easily on the table A, and it may be curved, as shown in Fig. 2, or it may be made in the shape of a flat plate, either oblong or in any desirable form. If desired, the feed mechanism may be dispensed with and the cutting mechanism may be directed entirely by the action of the workman, who can turn the same in any direction, or draw it out or push it in, as the formation of the pattern may require, so as to cause the knife to follow the contours of the pattern. In the front side of the feed-wheel is secured a sharpening stone or sharpening device, *m*, which bears against the side of the disk knife and serves to keep the cutting edge of the knife sharp. As the sharpening device revolves with the feed-wheel it presents a constantly varying surface to the knife. When the cutting edge of the knife wears away the bracket *q*, which forms the bearings for the spindle *p*, may be lowered, and the cog-wheel K is extended to make up for the difference.

(Here follows diagram marked p. 104.)

105 What I claim as new and desire to secure by letters patent is—

1. The combination of a rotating disk knife with a throat-plate containing a knife-receiving socket and with a sliding and revolving shaft for imparting motion to said knife by suitable gear, substantially as shown and described.

2. The rod G, which rises from the throat-plate and forms the bearings for a sleeve, F, and a cog-wheel, K, in combination with a rotating disk knife and with a sliding and revolving shaft, substantially as set forth.

3. The sectional telescopic cog-wheel K, in combination with the throat-plate J, the rotating disk knife L, and the sliding and revolving shaft C, substantially as described.

4. The combination of an automatic feed with a rotating disk knife, a throat-plate, a sliding and rotating shaft, and operating gear, substantially as set forth.

5. The sharpening device *m'*, mounted in the feed wheel *h'*, in combination with the disk knife L and with the mechanism for imparting motion to said parts, substantially as described.

ALBIN WARTH.

Witnesses:

W. HAUFF.
E. F. KASTENHUBER.

No. 331. Dobson et al. v. Lee et al. } p. 104

104

# A. WARTH.

## Cloth-Cutting Machines.

No. 130,344. Patented Aug. 6, 1872.

Fig. 1.

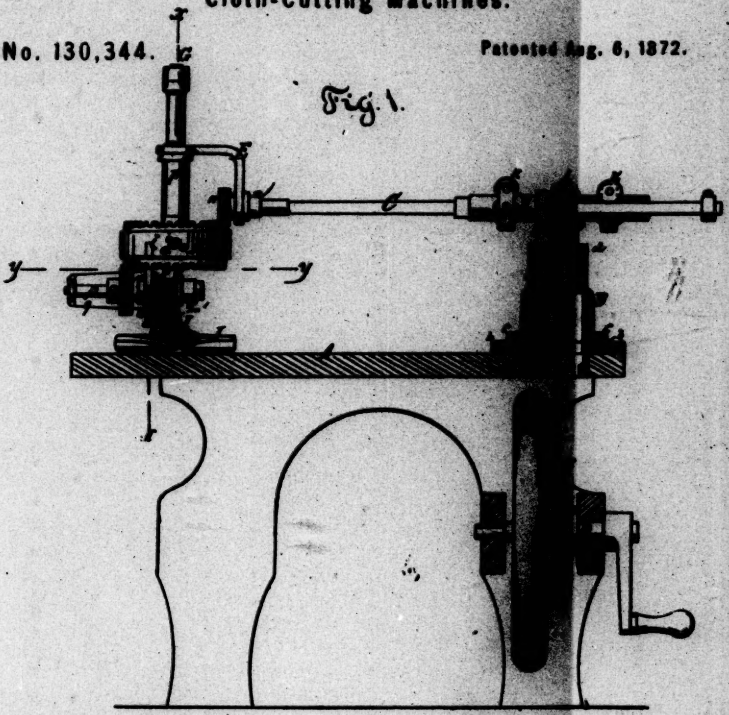



Fig. 2.

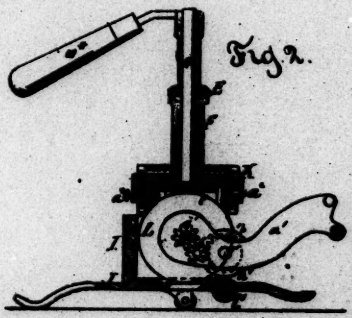
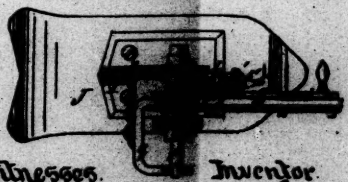


Fig. 3



Witnesses.
Ernst Kirchner
Chas. Wahlers

Inventor
Albin Warth
per Victor J. Evans & Co.
Attys.

*Specification.*

A. D. 1863, 18th May. No. 1247.

Condensing machines for working yarns of wool, &c.

Letters patent to Joseph Beaumont, of Moate, in the county of Westmeath, scribbling engineer, for the invention of "improvements in condensing machines for working yarns of wool and other fibrous substances."

Sealed the 9th October, 1863, and dated the 18th May, 1863.

Provisional specification left by the said Joseph Beaumont at the office of the commissioners of patents, with his petition, on the 18th May, 1863.

I, Joseph Beaumont, of Moate, in the county of Westmeath, scribbling engineer, do hereby declare the nature of the said invention for "improvements in condensing machines for working yarns of wool and other fibrous substances" to be as follows:

My invention of improvements in condensing machines for working yarns of wool and other fibrous substances has for its object to increase the fineness of the slubbing, roving, or yarn without diminishing the quantity of work produced, thereby effecting a
107 considerable economy in the manufacture. This is effected by passing the slubbing between a series of pairs of rollers and rubbers, in which certain of the rollers act as bottom rollers and rubbers and the other rollers act as top rollers and rubbers. Both bottom and top rollers act as drawing rollers, and therefore the fibres or slubbing will be rubbed between these rollers in the process of drawing. As these rollers work one over the other, the fibres or yarn in the form of a slubbing will be drawn between them, and at the same time will undergo the process of rubbing by means of the same rollers, to which an endway reciprocating motion in the direction of their axis will be communicated while they are rotating on their axis. These rollers are rotated by means of toothed wheels and pinions actuated by a driving wheel connected with the doffing cylinder. The draught of the rollers is produced by increasing the size of the toothed gear by which they are actuated, so as to cause each pair of rollers to go a little faster than the pair immediately preceding. By this mode of condensing, the slubbing can be drawn from twenty-five to one hundred per cent. finer than by the usual method, the quality of work depending upon the fineness of the substance or material employed or acted on. The particular draught required for different descriptions of fibres is effected by changing the size of the pinions of the rollers, more particularly the pinions of the bottom rollers.

From the foregoing description it will be understood that the essential features of the invention is passing the slubbing between con-

secutive pairs of rollers, with which the work of drawing and rubbing is performed at the same time, so that greater fineness is thereby obtained.

108 Specification in pursuance of the conditions of the letters patent filed by the said Joseph Beaumont in the Great Seal Patent Office on the 18th November, 1863.

To all to whom these presents shall come I, Joseph Beaumont, of Moate, in the county of Westmeath, scribbling engineer, send greeting:

Whereas her most excellent majesty Queen Victoria, by her letters patent, bearing date the eighteenth day of May, in the year of our Lord one thousand eight hundred and sixty-three, in the twenty-sixth year of her reign, did, for herself, her heirs, and successors, give and grant unto me, the said Joseph Beaumont, her special license that I, the said Joseph Beaumont, my executors, administrators, and assigns, or such others as I, the said Joseph Beaumont, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britian and Ireland, the Channel Islands, and Isle of Man, an invention for "improvements in condensing machines for working yarns of wool and other fibrous substances," upon the condition (amongst others) that I, the said Joseph Beaumont, by an instrument in writing under my hand and seal, should particularly describe and ascertain the nature of the said invention and in what manner the same was to be performed and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said letters patent:

109 Now know ye that I, the said Joseph Beaumont, do hereby declare the nature of my said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement, reference being had to the drawing hereunto annexed, and to the letters and figures marked thereon (that is to say):

My invention of "improvements in condensing machines for working yarns of wool and other fibrous substances" has for its object to increase the fineness of the slubbing, roving, or yarn without diminishing the quantity of work produced on the condenser, thereby effecting a considerable economy in the manufacture. This is effected by passing the slubbing between a series of pairs of rollers and rubbers, in which certain of the rollers act as bottom rollers and rubbers and the other rollers act as top rollers and rubbers. Both bottom and top rollers act as drawing rollers, and therefore the fibres or slubbing will be rubbed between these rollers in the process of drawing. As these rollers work one over the other the fibres or yarn in the form of a slubbing will be drawn between them, and at the same time will undergo the process of rubbing by means of the same rollers, to which an endway reciprocating motion in the direction of

their axis will be communicated while they are rotating on their axis. These rollers are rotated by means of toothed wheels and pinions actuated by a driving wheel connected with the doffing cylinder, the toothed wheels and pinions being of such diameter and numbers of teeth and so arranged with reference to each other that a progressively increasing rotary motion may be communicated thereto.

It will be evident that by progressively increasing the size of
110 the toothed gear by which the rollers are actuated so as to cause each pair of rollers (or, if driven by pulleys instead of geared wheels, by lessening or increasing their size) to go a little faster than the pair immediately preceding, a drawing action is given to the rollers, so that the slubbing will be drawn out while being rubbed and condensed. By this mode of condensing the slubbing can be drawn from twenty-five to one hundred per cent. finer than by the usual method, if required (the quality of work depending upon the fineness of the substance or material employed).

The particular draught required for different descriptions of fibres is effected by changing the size of the pinions of the rollers, more particularly the pinions of the bottom rollers.

In the accompanying drawing, Fig. 1 is a plan view of so much of a condensing machine as is necessary to show my invention. Fig. 2 is an elevation of that side of the apparatus at which the driving gear is placed. Fig. 3 is a similar view of the opposite side, showing the arrangement for giving the endway motion to the rollers.

C is the doffer of a carding engine, the rest of which is not shown in the drawing, as being unnecessary. This doffer receives the wool from the cylinder of the carding engine in the usual manner, and the wool is stripped therefrom by means of doffer roller D, which conducts the wool to the first pair of rubbing rollers E *e*. These rollers form the wool into a kind of slubbing, which passes forward to the second pair of rollers F *f*, to which a somewhat quicker rotary motion is given, so that they put a draft on the wool. The drawn out and condensed slubbings pass to a third and fourth pair of rubbing and drawing rollers, G *g* and H *h*, whereby they are drawn out and rubbed into threads, in which form they pass through
111 the traverser bar I, whereby they are guided and arranged on bobbins not shown in the drawing, but which are actuated by the bobbin drum J. A stud, pulley, or wheel, K, receives motion from the carding engine so as to drive the doffer C, on the axle of which is a spur wheel, L, whereby the doffer roller D and the driving gear of the rollers E, F, G, and H are actuated. This driving gear consists of the change pinions *m m m m*, on the axles of the under rollers, and the intermediate change pinions *c c c c*. Another wheel, O, Fig. 1, on the axle of the doffer roller D, gears into and drives a wheel, N, on the axle of the rubbing roller E. On the axles of the lower rollers E, F, G, and H are long pinions *p p p p*, and on the axles of the upper or rubbing rollers are other pinions *r r r r*, which gear into and are driven by the long pinions *p p*. The bobbin drum J is driven by a band passing round a pulley, T, on the lower drawing roller H, and also round a large pulley, U, on the axle of the bobbin roller. On the other end of the axle of the bobbin

roller is an oblique or zigzag pulley, V, whereby the bar I is traversed backwards and forwards, so as to lay the threads regularly on the bobbins as they are delivered from the last pair of drawing rollers H *h*.

It will be seen by referring to the drawing that there are two sets of doffers and rubbing and drawing rollers adapted to the same carding engine, and that motion is communicated from one set of doffers to the other by means of an intermediate wheel, L*, so that the two sets of apparatus may act uniformly and simultaneously. An endway motion, so as to produce a rubbing action, is communicated to the rollers by means of the vertical shaft *l*, which is supported in a step below, and turns in bearings *n n*, fixed to the framing of the machine. Eccentrics W W W W are mounted in
112 the shaft *l*, and are connected by straps to bars *o o*, in which the axles of the rollers are mounted. It will now be seen that as the vertical shaft *l* rotates and carries round with it the eccentrics W W a lateral motion will be imparted to the rollers at the same time that they are receiving a rotary motion from the gearing, and by this means a rubbing and drawing action will be produced.

In order to render the machine suitable for operating upon material of various qualities, the upper rollers *e f g h* are mounted in movable bearings, which are capable of adjustment vertically, by means of set-screws *j j j j*, as shown in the drawing. The pinions *m m m m* of the drawing rollers E F G H, and also the intermediate pinions *c c c c* may be changed, when required, for others of different numbers of teeth. To facilitate this operation the bearings of the pinions *c c* are made adjustable, as shown in Fig. 2, so that they may be set at any distance.

It will be readily understood by practical men that, being enabled to use a great variety of change wheels and pinions, I am enabled to work all kinds of wools, from the longest and coarsest to the shortest and finest staple, and also various mixtures of substances, thereby superseding the use of the carder and billy in the manufacture of yarns for blankets, carpets, hosiery, and analogous fabrics.

Having now described my invention of "improvements in condensing machines for working yarns of wool and other fibrous substances," and having explained the manner of carrying the same into effect, I claim as the invention secured to me by letters patent as aforesaid, combining the rubbing and drawing processes, as herein set forth.

(Here follow diagrams marked pp. 113, 114, & 115.)

116 In witness whereof I, the said Joseph Beaumont, have hereunto set my hand and seal this twelfth day of November, in the year of our Lord one thousand eight hundred and sixty-three.

JOSEPH BEAUMONT. [L. S.]

Witness:

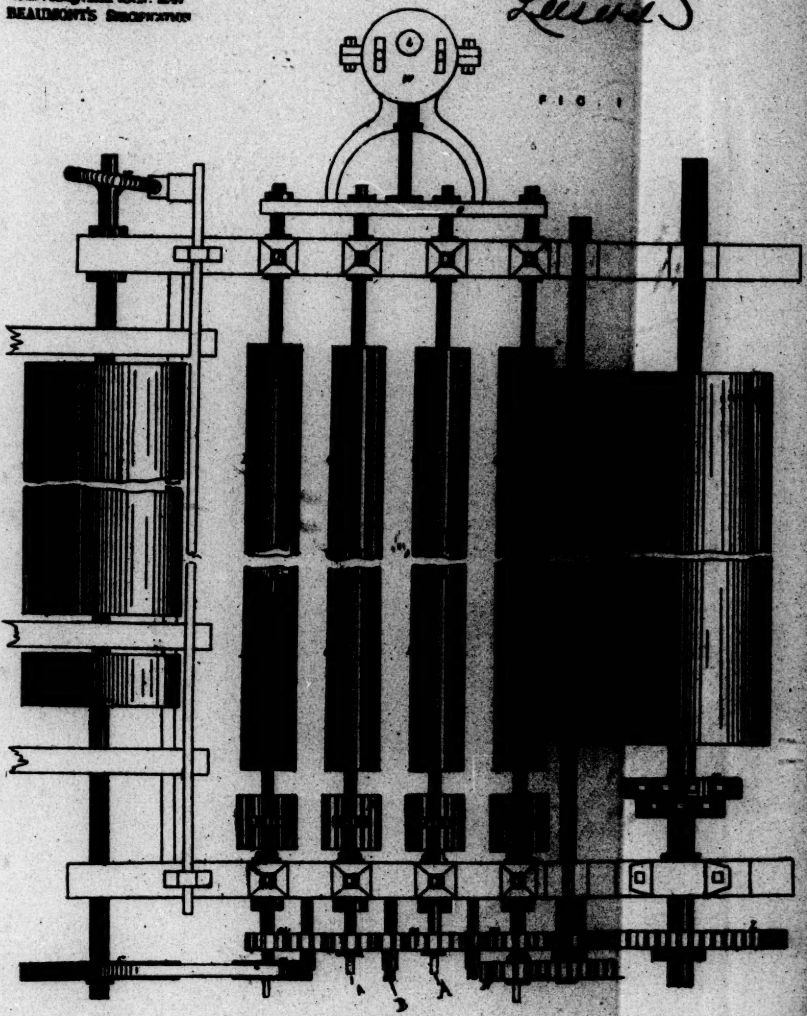
THOMAS PARSONS,

*Of Moate, Co. Westmeath.*

No. 334. Dalmuthl. Lilliard } p. 113

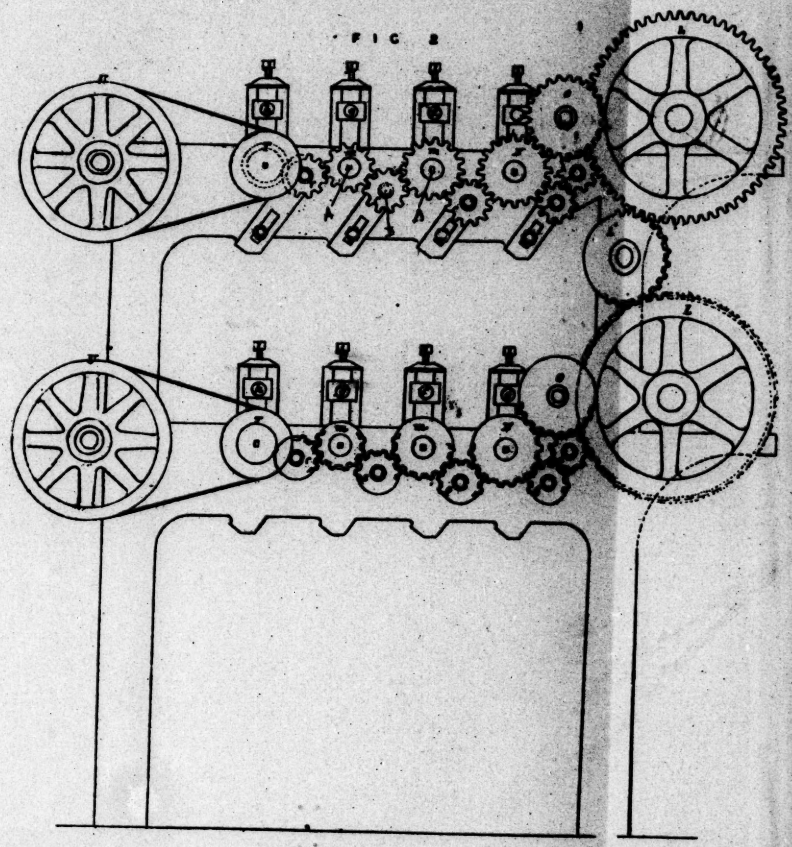
A.D. 1948. Mar 16. N° 1947
BEAUMONT'S SPECIFICATION

FIG. 1



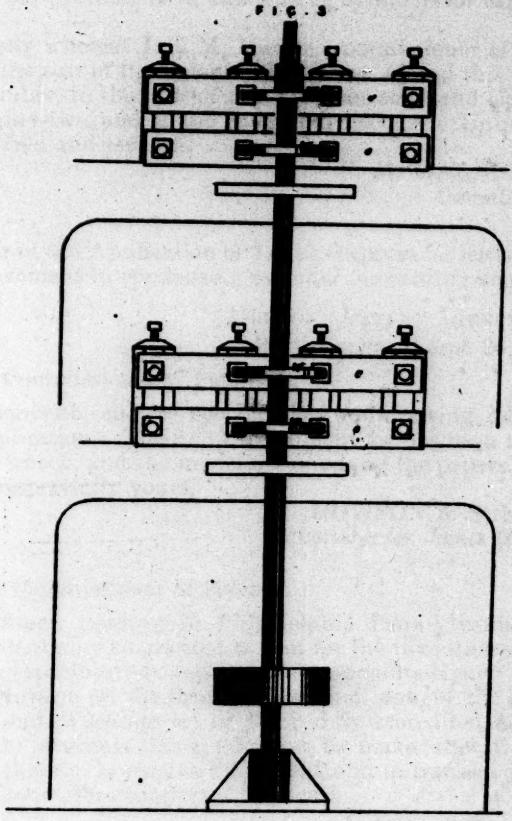
No. 331.
Dabin et al.
v.
Leitch et al
} p. 114.

FIG 2



No. 331. 45
Dobsmetal. } p. 115
v.
Lesmetal

FIG. 3



117 DEFENDANTS' EXHIBIT 2.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file wrapper and contents in the matter of the letters patent granted James Greaves February 20, 1877, number 187,620, for "improvement in condensing cylinders for carding engines."

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this fifteenth day of September, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

E. M. MARBLE,
[L. S.] *Commissioner.*

In the Matter of the Application of JAMES GRIEVES for letters patent for improvement in condensing cylinder for carding engines.

HOWSON'S PATENT AGENCY,
PHILADELPHIA, *Sept.* 26, 1872.

To the Hon. Commissioner of Patents:

SIR: We herewith enclose specification and drawing relating to the above application. The first Government fee has been this day forwarded by check, and the model accompanies the papers.

Very respectfully yours,

HOWSON & SON,
*Attorneys for James Grieves.*

118 To the Commissioner of Patents:

Your petitioner, residing in Philadelphia, Pennsylvania, prays that letters patent may be granted to him for the invention set forth in the annexed specification, and he hereby appoints Henry Howson and Charles Howson (of the firm of Howson & Son, of the cities of Philadelphia and Washington), or their duly accredited assistant, his attorneys to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

JAMES GREAVES.

*Specification*

Substitute sub. spec'n Nov. 29, 1876.

Describing an improvement in condensing cylinders for carding engines, invented by James Greaves, of the city and county of Philadelphia, State of Pennsylvania.

Improvement in condensing cylinders for carding engines.

The object of my invention is to furnish the condensing cylinders of carding engines with spindles of a more durable character than those in common use, and this object I attain by making such spindles of cast iron instead of wrought iron or steel. The spindle of a condensing or rubbing cylinder for carding engines consists of a light bar, to which the cylinder of tinned plate is soldered or otherwise secured, this bar being turned at its opposite ends. Fig. 1 of the accompanying drawing represents one end of the spindle in its normal condition. On the turned portion, which extends from *x x*, is a key or feather, *a*, adapted to a groove in the hub of the wheel, through which the spindle passes and through the medium of which a rotary motion is im-
119 parted to the cylinder. Fig. 2 is a transverse section of the spindle on the line 1–2. As the cylinder revolves it reciprocates, the spindle sliding to and fro through the hub of the wheel. By constant friction in this hub the spindle is soon worn and reduced to the condition shown in Fig. 3, which causes the cylinder to operate so imperfectly as to demand a new spindle. This necessity for constantly removing the spindles is a source of much annoyance and expense, as the detaching of the tin cylinders and securing them to new spindles requires tedious manipulation. Heretofore these spindles have been made of wrought iron or steel; but no matter how carefully hardened they may be, they soon become worn to the condition shown in Fig. 3. I have ascertained by long-continued tests that spindles made of simple cast iron will last at least five times as long as those made of either wrought iron or steel. Without attempting to give a satisfactory reason for this, it may be stated that cast iron appears to be specially well adapted for resisting the frictional action which results from the peculiar movement and operation of a condensing cylinder. It is not essential that the spindle, when it passes through the wheel, should in all cases be round. It may, for instance, be square, in which case the feather may be dispensed with.

I claim as my invention—

Er. & in. "A," Dec. 7, 1874.

The application, described, of cast-iron spindles to the condensing cylinders of carding engines.

Words and sentences enclosed between rules erased in copy.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES GREAVES.

Witnesses:
WM. A. STEEL.
HUBERT HOWSON.

120 CITY AND COUNTY OF PHILADELPHIA, } *State of Pennsylvania.* }

James Greaves, the above-named petitioner, being duly sworn, deposes and says that he verily believes himself to be the original and first inventor of the improvement in condensing cylinders for carding engines described in the foregoing specification; that he does not know or believe that the same was ever before known or used, and that he is a subject of the Queen of Great Britain and Ireland; has resided within the United States during the whole of the past year, and has taken the oath prescribed by law for becoming naturalized in this country.

JAMES GREAVES.

Sworn to and subscribed before me this fourth day of October, 1872.

WM. A. STEEL,
*Notary Public.* [L. S.]

MANAYUNK, TWENTY-FIRST WARD,
CITY OF PHILADELPHIA, PA., *October* 9, 1872.

In the Matter of the Application of JAMES GREAVES for a patent for improvement in the spindle or shaft of rubbing cylinders for condenser carding engine.

To the Commissioner of Patents.

SIR: I am well informed on the subject of the above-men-
121 tioned improvement, and in practice it is a saving of time, labor, and expense over the old method, and I consider it of great utility. It is new to me. I have had large experience as a wool-carder, and — at present the managing superintendent of Preston and Irwin's woolen mills at Manayunk.

WILLIAM H. PRESTON.

CITY OF PHILADELPHIA, } *ss:*
*State of Pennsylvania,* }

On the ninth day of October, 1872, before me, an alderman, personally appeared the above-named William H. Preston, superintendent, who, being duly sworn, depose- and say- that the foregoing statement by him signed is correct and true in all respects and particulars, to the best of his knowledge and belief.

J. F. SINQUET,
[L. S.] *Alderman and ex Officio Justice of the Peace.*

MANAYUNK, TWENTY-FIRST WARD,
CITY OF PHILAD'A, PENN., *October* 9, 1872.

In the Matter of the Application of JAMES GREAVES for a patent for improvement in the spindle or shaft of rubbing cylinders for condenser carding engine.

To the Comm'r of Patents.

SIR: I am well informed on the subject of the above-mentioned improvement, and in practice it is a saving of time, labor, and
122 expense over the old method, and I consider it of great utility. It is new to me. I have had large experience as a wool-carder, and am at present the proprietor and operator of large woolen mills at Manayunk, Philadelphia, Pa.

SEVILL SCHOFIELD.

CITY OF PHILADELPHIA, } ss:
*State of Pennsylvania,* }

On this ninth day of October, 1872, before me, an alderman, personally appeared the above-named Seville Schofield, woolen manufacturer, who, being duly sworn, deposes and says that the foregoing statement by him signed is correct and true in all respects and particulars, to the best of his knowledge and belief.

J. F. SINQUET,

[L. S.] *Alderman and ex Officio Justice of the Peace.*

MANAYUNK, TWENTY-FIRST WARD,
CITY OF PHILADELPHIA, PENNA., *October* 9, 1872.

In the Matter of the Application of JAMES GREAVES for a patent for improvement in the spindle or shaft of rubbing cylinders for the condenser carding engine.

To the Comm'r of Patents.

SIR: I am well informed on the subject of the above-mentioned improvement, and I have had the same in operation at my woolen-yarn mill for some time, and I find in practice that they save time, labor, and expense over the old method. I consider the im-
123 provement of great utility. It is new to me. I have had considerable experience as a wool carder and spinner, and — at present the proprietor and operator of a manufactory of woolen yarns at Manayunk, Philadelphia, Pa.

THOMAS SCHOFIELD.

CITY OF PHILADELPHIA, } ss:
*State of Pennsylvania,* }

On this ninth day of October, 1872, before me, an alderman, personally appeared the above-named Thomas Schofield, manufacturer of woolen yarns, who, being duly sworn, deposes and says that the foregoing statement by him signed is correct and true in all respects and particulars, to the best of his knowledge and belief.

J. F. SINQUET,

[L. S.] *Alderman and ex Officio Justice of the Peace.*

No. 1. U. S. PATENT OFFICE,
WASHINGTON, D. C., *Oct.* 29, 1872.

James Greaves, care Howson & Son, present:

Please find below a communication from the examiner concerning your application, filed September 30, 1872, for a patent for rub-rolls for condenser cards.

Very respectfully,

——— ———,
*Commissioner.*

124 Examiner's Room No. 93.

A patent cannot be allowed for the alleged invention claimed in the above-named case. The qualities of cast iron are so well known that its employment in lieu of wrought iron, etc., in situations where durability is requisite cannot be regarded as an invention. It is a clear case of the mere substitution of one well-known material for another. The application is rejected.

G. W. GREGORY, *Ex.*,
Per E. N. CALLAN, *Ass't.*

Before the U. S. Patent Office.

[illegible]licant, J. Greaves; invention, condensing cylinder. Filed 30 Sep., 1872.

WASHINGTON, D. C., *Dec.* 5, 1872.

To the Hon. Commissioner of Patents.

SIR: We request a second rejection *pro forma* of this case to allow of appeal.

Respectfully, HOWSON & SON, *Att'ys.*

125 No. 1. U. S. PATENT OFFICE,
WASHINGTON, D. C., *Dec.* 7, 1872.

James Greaves, care Howson & Son, present:

Please find below a communication from the examiner concerning your application, filed Sept. 30, 1872, for a patent for a rub-roll for condenser cards.

Very respectfully,

——— ———,
*Commissioner.*

Examiner's Room No. 93.

The reasons given in the former official communication are considered sufficient for refusing to grant a patent, and they are adhered to; and, in addition, reference is made to the English patent of Leigh, No. 13027, of 1850 (the sixth part of the invention).

The application is again refused.

G. W. GREGORY, *Ex.*,
Per E. N. CALLAN, *Ass't.*

In the Matter of the Application of J. GREAVES for letters patent for spindle. Filed 30th Sep., '72.

WASHINGTON, D. C., *Dec.* 7, 1874.

Hon. Commissioner of Patents.

SIR: We amend the specification of this application by substituting for the claim the following:

A. A spindle for carding-machine rollers, rectangular in form, for the purpose set forth.

Respectfully, HOWSON & SON.

126 No. 1. Examiner's Room No. 93.

U. S. PATENT OFFICE,
WASHINGTON, D. C., *Dec'r* 9, 1874.

Rub-roll for condenser cards. Filed Oct'r 5, 1872.

James Greaves, care Howson & Son, present:

The application having been a second time rejected, the amendment filed the 7th inst. cannot be considered, except as provided in section 31 of the office rules.

W. H. APPLETON, *Ex.*,
Per E. N. CALLAN, *Ass't.*

In the Matter of the Application of JAMES GREAVES for *application for* letters patent for "improvement in carding-engine spindles." Filed Jan. 20, 1875.

CITY OF PHILADELPHIA, } ss:
*State of Pennsylvania,* }

James Greaves, the above-named petitioner, being duly sworn, deposes and says that he verily believes himself to be the first and original inventor of the improvement described and claimed in the amendment of January 20, 1875, and that he does not know or believe that the same was ever before known or used.

JAMES GREAVES.

Sworn to and subscribed before me this twenty-second day of January, A. D. 1875.

A. P. RUTHERFORD, [L. S.]
*Notary Public.*

Words and sentences enclosed between rules erased in copy.

127 In the Matter of the Application of JAMES GREAVES for letters patent for condensing cylinder for carding engines. Filed Oct. 5, 1872.

PHILADELPHIA, *Jan.* 19, 1875.

Hon. Commissioner of Patents.

SIR: We amend the above application—

First. By marking the drawing originally filed "sheet 1" and introducing the accompanying drawing, marked "sheet 2."

Second. By substituting for the specification originally filed the following:

Specification describing certain improvements in condensing cylinders for carding engines, invented by James Greaves, of Philadelphia, Pennsylvania.

The object of my invention is to furnish the condensing cylinders of carding engines with spindles of a more durable character than those in common use, and this object I attain by making such spindles of square or angular section, where they slide to and fro through the hub of the driving wheel, and by constructing them preferably of cast iron instead of wrought iron or steel.

The spindle of a condensing or rubbing cylinder for carding engines consists ordinarily of a light bar, to which the cylinder of tinned plate is soldered or otherwise secured, this bar being turned at its opposite ends.

Fig. 1 (sheet 1) of the accompanying drawing represents one end of an ordinary spindle in its normal condition. On the turned portion, which extends from $x$ to $x$, is a key or feather, $a$, adapted
128 to a groove in the hub of the driving wheel, through which the spindle passes and through the medium of which a rotary motion is imparted to the cylinder.

Fig. 2 is a transverse section of the spindle on the line 1–2. As the cylinder revolves it reciprocates, the spindle sliding to and fro through the hub of the wheel. By constant friction in this hub the spindle is soon worn and reduced to the condition shown in Fig. 3, which soon causes the cylinder to operate so imperfectly as to demand a new spindle. This necessity for constantly renewing the spindles is a source of much annoyance and expense, as the detaching of the tin cylinders and securing them to new spindles requires tedious manipulation.

Heretofore these spindles have been made round and of wrought iron or steel, but, no matter how carefully hardened they may be, they soon become worn to the condition shown in Fig. 3.

I have ascertained by long-continued tests that simple cast iron is a much more durable material for the purpose than either wrought iron or steel. Without attempting to give a satisfactory reason for this, it may be stated that cast iron appears to be especially well adapted for resisting the frictional action which results from the peculiar movement and operation of a condensing cylinder.

By making that portion of the spindle X which slides to and fro through the hub of the driving wheel A square or angular, as shown

in Figs. 4 and 5, sheet 2, and by imparting a corresponding shape to the aperture in the hub, the key or feather may be dispensed with, and the durability of the spindle will be so greatly increased that I prefer in most cases to adopt this shape.

129 I claim as my invention—

6. The combination, substantially as described, of the condensing cylinder of a carding engine, the driving wheel A, the hub of which has a square or angular aperture, and the spindle X, having a corresponding shape imparted to that portion of it which slides through the said hub, all as set forth.

We also request that the accompanying model be filed in this case, as it more clearly represents the invention than that on file in the office.

Yours respectfully, HOWSON & SON,
*Att'ys for J. Greaves.*

No. 1. Examiner's Room No. 93.

U. S. PATENT OFFICE,
WASHINGTON, D. C., *January* 20, 1875.

Rub-roll for condenser cards. Filed Oct'r 5, 1872.

James Greaves, care Howson & Son, present:

The same objection exists to the reception of the amendment filed this day as was made to the reception of that filed the 7th ult.

In addition to this, as the matter claimed is entirely different from that covered by the original affidavit, a new oath must be filed, as required by section 11 of the office rules.

W. H. APPLETON, *Ex.*,
Per E. N. CALLAN, *Ass't.*

130 (No. 1.) Examiner's Room No. 93.

U. S. PATENT OFFICE,
WASHINGTON, D. C., *January* 27, 1875.

Rub-rolls for carding machines. Filed Oct. 5, 1872.

James Greaves, care Howson & Son, present:

Spindles which have an endway as well as a rotary motion are commonly made square in the part which passes through the driver, as may be seen by reference to Davison and Crowther's English patent No. 2885, of 1856, and others, and the adoption of this form in connection with one particular spindle rather than another cannot be considered patentable.

The amended claim is therefore refused.

W. H. APPLETON, *Ex.*,
Per E. N. CALLAN, *Ass't.*

In the Matter of the Application of J. GREAVES for letters patent for spindle. (Filed 30 Sep., '72.)

113
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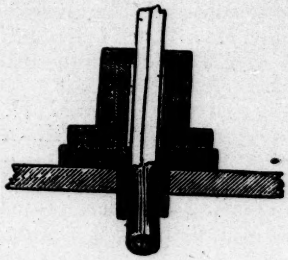
93

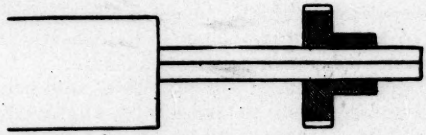
WASHINGTON, D. C., *Feb.* 5, 1875.

Hon. Commissioner of Patents.

SIR: There is more than a mere difference in application between the combination of a square spindle and a con-
131 densing roller and the combination of a square spindle and a bobbin, as shown in English patent 2885, for 1856.



In the latter case the shaft A has its bearing in a step at the lower end; its movement through the cap *a* is slow; there is little tendency to wear, and such slight wear as does occur does not prevent the turning of the spindle with and by the cap, even where a round spindle and feather are used.



A condensing roller is necessarily horizontal. It bears with its whole weight upon the inner face of the driver and has an exceedingly rapid sliding motion therein, which, in the course of a few days, will wear a cylindrical shaft to the form shown in Fig. 3.

The square shaft will wear longer than one cylindrical in form, and when worn continues to be effective where a shaft with a feather would be useless.

132 The examiner is too well aware of the advantages resulting from the combination of the square spindle and rub-roller to require any extended explanation upon this point. We therefore submit that, in view of the results thereby effected, the applicant's claim should receive a favorable consideration, unless a reference can be found showing a square spindle combined with a horizontal sliding and rotating cylinder.

Respectfully, HOWSON & SON.

No. 1. Examiner's Room No. 93.

U. S. PATENT OFFICE,
WASHINGTON, D. C., *Feb'y* 26, 1875.

Rub-roll for carding machine. Filed Oct'r 5, 1872.

James Greaves, care Howson & Son, present:

In view of the reference cited in the last official letter, and also of the patents of Harraday, May 30, 1854, No. 10986, and Warth, Aug. 6, 1872, Nos. 130,343 and 130,344 (cloth-cutting), the application must be again refused.

WM. H. APPLETON, *Ex.*,
Per E. N. CALLAN, *Ass't.*

133 In the Matter of the Application of J. GREAVES for letters patent for condensing cylinder. Filed Sep. 30, '72.

113
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93

WASHINGTON, D. C., *March* 18, 1875.

Hon. Commissioner of Patents.

SIR: The object of the applicant's invention is to overcome serious difficulties resulting from the modes ordinarily employed in driving "rub-rolls." For this purpose he combines with a roll devices which are admitted to effectually accomplish the desired purpose, and he claims in his application for a patent the combination of the roll and the devices for operating the same.

It is no answer to this claim to show that somewhat similar devices have heretofore been in situations where they effect a very different purpose from that attained by their combination with a condensing cylinder.

The vertical square spindle shown in Harraday's patent is used under the same conditions as that shown in English patent 2885, for 1856, with the result fully set forth in our argument of Feb. 5, 1875. In neither case does the square spindle bear with any pressure upon the sides of the square opening in which it slides.

In Warth's patent, 130,344, a horizontal square spindle is used, but it is not combined with a rub-roller. It has no positive longitudinal movement, only as it is adjusted from time to time (and it is the rapid longitudinal motion that wears away the spindles of rub-rolls), and instead of sliding in the driving hub it rests upon friction rollers, which, if used in a condensing engine, would be inoperative in a few hours.

Respectfully, HOWSON & SON.

134 No. 1. Examiner's Room No. 93.

U. S. PATENT OFFICE,
WASHINGTON, D. C., *March* 31, 1875.

Copy sent
April 1, 1875.
M. A. C.

Rub-roll for carding machines. Filed Oct. 5, 1872.

James Greaves, care Howson and Son, present:

The application is again refused upon the references already cited.

W. H. APPLETON, *Ex.*,
Per E. N. CALLAN, *Ass't.*

In the Matter of the Appl'n of JAMES GREAVES for letters patent for "improvement in spindles." Filed in the fall of 1872. Room 93 (probably).

(Endorsed: Power of attorney. Filed July 31, 1876.)

I, James Greaves, the above applicant, hereby revoking any and all former powers of attorney heretofore granted by me in the above matter, do hereby make, constitute, and appoint George E. Buckley, of Philadelphia, Pennsylvania, my true and lawful attorney, in the matter of above application, to prosecute the case to issue, and to do all matters in that behalf the same as I myself could personally do were this power of attorney not granted.

JAMES GREAVES.

135 204 So. 5TH ST., PHILADA., *Sept.* 4, 1876.

Hon. Comm'r of Patents.

SIR: The following is a copy of letter sent by me to you, viz:

"PHILADA., *July* 29, 1876.

Hon. Comm'r of Patents.

SIR: In the matter of the app'n of James Greaves for imp'ts in spindles, filed in the fall of 1872, room 93 (probably)—

Sir, please let me know the condition in which this appl'n stands. If rejected, please send me duplicate letter of rejection. The case was never abandoned, as the applicant has made continuous and frequent efforts by letters to the Patent Office to get information regarding it.

Very resp'y, GEORGE E. BUCKLEY, *Att'y.*"

Your answer to the above letter was rec'd by me, but has been mislaid. Would you be so kind as to send me a duplicate of your answer?

Yours, &c., GEORGE E. BUCKLEY.

(Endorsed: Patent Office, Sept. 5, 1876.)

136 DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Sept.* 14, 1876.

Condensing cylinders for carding engines. Filed Oct. 5, 1872.

James Greaves; Geo. E. Buckley, Esq., No. 204 South 5th St., Phil., Pa.:

In reply to applicant's letter of the 4th inst., requesting information relative to the status of the above-mentioned case, he is informed that the said case was rejected by the examiner a second time on references, March 31, 1875, and that this decision has been affirmed by both the board of examiners-in-chief and the Commissioner. The decision of the Commissioner was rendered Nov. 11, 1875, since which time no further action has been made in the case by either the office or the applicant.

WM. H. APPLETON, *Examiner.*

Approved for examination.

W. H. DOOLITTLE,
*Act'g Com'r.*

Octo. 11, 1876.

WASHINGTON, *Oct.* 11, 1876.

In Matter — Appl'n of GREAVES for "imp'ts in carding engines." Filed Oct. 4, 1872.

Comm'r of Patents.

SIR: Applicant hereby amends above matter by inserting
137 before the words "The object," on the 3d page of his specification, the following nature of invention (said specification is amendment of Jan. 20, 1875):

My invention consists of the combination, in a carding engine, of a reciprocating condensing cylinder, a driving wheel, C. and a polygonally shaped spindle, the said spindle revolving and at the same time continuously reciprocating in a correspondingly polygonally shaped bearing, all in combination with an eccentric to produce reciprocating action.

Also of the combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle, the spindle being of the same metal as the bearing in which it reciprocates.

Also of the combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle, the spindle being of metal of the same or approximately the same degree of hardness as the bearing in which it reciprocates.

Also of the combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle [and feather, A] the said spindle being constructed of cast iron and its feather of another metal of tougher consistency, such as steel or wrought iron.

Words and sentences enclosed between rules erased in copy.

Also of the combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle and feather, the said spindle being of a short or cast metal and its feather of a fibrous or tough metal, the feather and the spindle being of two different metals.

Also of the combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle and feather, the said spindle being of cast iron and the bearing in which it
138 reciprocates being also of cast iron, so that in the reciprocating action the tendency of the crystalline particles of cast metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter.

Also amend by striking out the first clause of page 3 and inserting the following clause in lieu thereof:

The object of my invention is to furnish the condensing cylinders of a carding engine with more durable spindles by making these spindles of such material as will avoid the wear heretofore occasioned by the reciprocating action of the spindle and its bearing one upon the other. This is attained by making the spindle of material having the same crystalline structure as that of said bearing. This insures regular and good work by the reciprocating condensing cylinders. If one were cast iron and the other of some other material, the crystalline particles of the former would, in continuous friction, quickly bite away the crystalline particles of the latter, as the heat occasioned and destroys all tempering, but when both are cast iron a perfectly smooth and glassy surface is soon attained by the friction, and the greatest durability is attained. While I have found that a steel spindle in a cast-iron bearing is seriously worn in a few months, I have found in practice that a cast-iron spindle under the same auspices has shown no perceptible wear after four years' use. This makes a saving of from twenty-five to fifty-four dollars per year per carding engine, which would be otherwise lost from worn spindles and labor and time in setting them. The saving depends upon the cleanliness or dirty character of the work done upon the machine. One cause of the freedom from wear is the fact that spindle and bearing are of the same metals. Their being of the same hardness is another cause.

139 Durability is also accomplished by making the spindle polygonally shaped in cross-section, for, the feather being omitted, each of the corners of the polygon acts as a lever in revolving the bearing, and the wear occasioned by the rapid reciprocating action is evenly and generally distributed. The fact

Words and sentences enclosed between rules erased in copy.

also of having the feather, when one is used, of some metal of tougher texture than the spindle itself is great insurance that, if the spindle should crack across, the feather would still hold it together and insure continued working, as it is tightly wedged in its groove in the spindle.

My invention relates to condensing carding engines, and it is well known that in *use* these *are* eccentric is the means commonly employed to give A reciprocating motion A to the condensing cylinders; also that A in all cases the bearing in which the spindle reciprocates is of cast metal, and the feather of the spindle has been variously made of steel and wrought iron, and my object is in such machines to obtain the best results with the least cost and labor.

Also amend by striking out, on the 10th and 11th lines of page 4, the period preceding the word "Without," and the words "Without attempting to give a satisfactory reason for this," and substitute for the matter thus erased a colon, to wit:

On lines 17 & 25, A page 4, erase words "square or angular," and in each case substitute the words

V polygonal in cross-section.

Also amend by inserting after the word "shape," on the line 21 of page 4, in a new paragraph, the following, to wit:

I am well aware that an A square spindle has been used in spinning frames; also that in cloth-cutting apparatus a triangular shaft, adjustable lengthwise in its bearings, has been patented before the date of my application for a patent. These I do not claim; but what I do claim as new, and desire to secure by letters patent, is—

1st. The combination, in a carding engine, of a reciprocating condensing cylinder, a driving wheel, and a polygonally shaped spindle, the said spindle A revolving and at the same time A continuously reciprocated in a correspondingly polygonally shaped bearing, all in combination with an eccentric A to produce reciprocating action, substantially as described and for the purposes set forth.

2d. The combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle, the spindle being of the same metal as the bearing in which it reciprocates, substantially as and for the purposes described.

3d. The combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle, A the spindle being

Words and sentences enclosed between rules erased in copy.

of metal of the same or approximately the same degree of hardness as the bearing in which it reciprocates, substantially as and for the purpose described.

4th. The combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle and feather, the said spindle being constructed of cast iron and its feather of another metal of tougher consistency, such as steel or wrought iron, substantially as and for the purposes described.

5th. The combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle and feather, the said spindle being of short or cast metal and its feather of a
141 fibrous or tough metal, the feather and the spindle being of two different metals, substantially as and for the purposes described.

6th. The combination of a continuously reciprocating condensing cylinder, a driving wheel, and a spindle and feather, the said spindle being of cast iron and the bearing in which it reciprocates being also of cast iron, so that in the reciprocating action the tendency of the crystalline particles of cast metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter, substantially as and for the purposes specified.

Respectfully submitted,

GEORGE E. BUCKLEY, *Att'y.*

Copy sent
Nov. 27, 1876.
M. McB.

Room No. 93.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *November* 27, 1876.

Condensing cylinder for carding engines. Oct. 5, 1872.

James Greaves, care of Geo. E. Buckley, No. 204 South 5th St., Philadelphia, Penn.:

The amendment filed by applicant in this case on the 12th ulto. has been considered.

The statement in the 19, 20, 21, 22, and 23 lines of page 6 of said amendment, that "it is well known that in these an eccentric is the means commonly employed to give reciprocatory motion to
142 the condensing cylinder" cannot be entertained, as the same has no warrant in the case as originally presented, and it must accordingly be erased.

The claims presented in the said amendment are functional in form, in this, that the combinations covered thereby are made to depend upon several of the elements comprising such combinations having certain motions. This, of course, is inadmissible, as operations, results, and effects are not patentable.

Words and sentences enclosed between rules erased in copy.

Further than this, the constructions sought to be covered by the fourth, fifth, and sixth claims are inconsistent with that covered by the seventh claim, and under the decision of the Com'r in the case of Eagle, page 137, Com'r's Decision, 1870, one or the other of said constructions must be erased.

In addition to the above, the reasons and references heretofore urged in the rejection of the preceding claims are believed to apply fully to those now presented, and they are accordingly rejected therefor and thereon.

WM. H. APPLETON, *Examiner.*

WASHINGTON, *Nov.* 29, 1876.

In Matter of Appl'n of GREAVES for letters patent for spindle. Filed Oct. 5, 1872. Room 93.

Comm'r of Patents.

SIR: Applicant hereby amends above matter by substituting the following specification for that now on file as amended:

To all whom it may concern:

Substitute spec'n. Be it known that I, James Greaves, of Philadelphia, State of Pennsylvania,

143 have invented certain new and useful improvements in condensing cylinders for carding engines, and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings making part hereof:

My invention consists of the combination, in a carding engine, of a condensing cylinder, a driving wheel, and a polygonally shaped horizontal shaft or spindle, when the latter being adapted to be revolved and at the same time to be continuously reciprocated in a correspondingly polygonally shaped bearing, and all in combination with a continuously reciprocating rubber, substantially as described.

Also of the combination of a continuously reciprocating rubber, a driving wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, when said shaft or spindle and the bearing in which it reciprocates being are both made of cast iron or both of a metal having the same crystalline structure, such as cast iron, whereby the crystalline particles of one will resist the wear which would otherwise be the tendency of the crystalline particles of the other.

This invention relates to condensing carding engines which have a reciprocating motion imparted to the rubbers. Heretofore it has been the practice to make the bearing in which the shaft or spindle reciprocates of cast iron and the shaft or spindle of steel and the feather of the latter of steel or wrought iron. This shaft or spindle is horizontal, and, in addition to the work

it has to perform, it is required by its position to sustain its weight upon its sides, which alone tends to wear them. Then, again, the crystalline formation of the metal forming the bearing in which the spindle reciprocates has been found to bite or A wear
144 the steel away to such an extent as to require a new set of spindles every few months, a spindle under such circumstances rarely wearing over nine months, even with clean work. Some difference will, of course, result from the dirty or cleanly character of the work done by the carding engine, but nine months is the average extreme limit of the use of this shaft or spindle. The wear of these shafts or spindles causes the reciprocating rubbers of the card to be untrue with respect to each other, thus occasioning the ruin of the work done by them and frequent breakage of that part of the apparatus.

The object of my invention is to overcome these difficulties and objections by making a more durable shaft or spindle, which I accomplish, in great measure, first, by making the spindle or shaft of such form as to distribute the wear occasioned by having to sustain its own A weight and the work it has to do evenly over several parts of its sides or surface; second, by making this shaft or spindle of metal having the same hard crystalline structure as the bearing in which it reciprocates. I have found, after four years' use, that my shafts or spindles so constructed A have a smooth, glassy surface, are not perceptibly worn, and have faithfully and continuously worked during all that period. On all kinds of work the adoption of my improved spindles has resulted in a saving of from twenty-five to fifty-four dollars per year upon each carding engine to which they have been applied.

The old-fashioned feather is still employed by me when I use a spindle of the form shown in figure 1, and this results in the shaft or spindle being of cast metal and the feather of steel or iron. The latter two metals are of tougher or less brittle texture than the former. Consequently, if the spindle
145 should crack across, the feather would hold it together, as said feather is tightly wedged in its groove in the spindle. The shaft or A spindle of a condensing or rubber cylinder for carding engines consists, ordinarily, of a light bar, to which the cylinder of tinned plate is soldered or otherwise secured. This bar, being turned by a pinion at one end, turns the "rubber" at its other end, thus forming a horizontal connecting shaft, commonly called a "spindle." The "rubber" has a rapid reciprocating motion at the same time that it is revolving rapidly upon its axis.

In the drawings—

Figure 1 (sheet 1) represents one end of an ordinary spindle in its normal condition.

Figure 2 is a transverse section of the spindle on the line 1–2 of figure 1.

Figure 3 shows a worn-out spindle.

Figure 4 (sheet 2), a side view of my polygonal shaft or spindle (square), showing also a part of the rubber and the pinion in which the shaft or spindle reciprocates.

Figure 5, a cross-section of the shaft or spindle in the bearing in which it reciprocates.

*a*, figure 1, is the feather; *x*, the body of the shaft or spindle; A, figure 4, is the pinion which turns the shaft or spindle X, and in the axis of which the latter reciprocates; C is the reciprocating "rubber." The feather *a* is adapted to a groove in the hub of the driving wheel or pinion, which wheel or pinion drives the shaft or spindle, as at A, figure 4, though in figure 4 a polygonal (square) shaft or spindle, X, is shown. The feather *a* is only requisite when the shaft or spindle is round.

146 Figure 3 shows a steel spindle worn out by the continuous friction of its cast-iron bearings and such wear as results from five to nine months' usage. The delay and trouble of removing these spindles is a source of much annoyance and expense, as the detaching of the tin cylinders and securing them to new spindles requires tedious manipulation. The old wrought-iron or steel spindle constantly required this attention.

I much prefer to make that part of the spindle which reciprocates upon or in its bearing of a polygonal shape in cross-section rather than to make it round and depend upon its feather to stand the wear occasioned by the revolving A motion of its bearing, as by A the former shape the wear is evenly distributed to the corners of the polygonal sides. When the shaft or spindle is square or polygonal A its bearing in which it reciprocates must be of corresponding shape.

I am well aware that an upright square spindle has been used in spinning frames, as in English patent No. 2885 for 1856; also that in cloth-cutting apparatus a triangular shaft, extendable lengthwise in its bearings, has been used. These I do not claim; but, having thus described my invention, what I desire to secure by letters patent is—

1st. The combination, in a carding engine, of a condensing or rubber cylinder, a driving wheel, and a polygonally shaped horizontal shaft or spindle when the latter being A is adapted to be revolved, and at the same time to be continuously reciprocated in a correspondingly polygonally shaped bearing, A all in combination with and A a continuously reciprocating rubber, substantially as and for the purposes described.

Insert F, Dec. 15, 1876.

147 2d. In a carding engine, the combination of a continuously reciprocating rubber, a driving wheel to turn said rubber,

and a horizontal shaft or spindle connecting the two together when being said shaft or spindle and the bearing in which it reciprocates are A both made of cast iron or both of metal having as cast iron, the same crystalline structure A whereby in the reciprocating action the tendency of the crystalline particles of cast metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter, substantially as and for the purposes described.

Inserted Feb. 9, 1877.

Respectfully submitted, GEORGE E. BUCKLEY.

Ex'd: E. A. M.
9 H. M. H.
See original specimen for signatures and witnesses.

Room No. 93.

Copy sent Dec. 2, 1876. M. McB.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Dec. 1st*, 1876.

Condensing cylinder for carding engines. Oct. 5, 1872.

James Greaves, care of Geo. E. Buckley, 204 So. 5th St., Philadelphia, Pa.:

The amended specification filed by applicant on the 29th ulto. has been received by the examiner and substituted in lieu of that last filed. The claims presented therein are the same in substance as those for which they are substituted, and are rejected on the references and for the reasons heretofore given.

WM. H. APPLETON, *Examiner*.

148 PHILADA., 204 So. 5TH.

In U. S. Patent Office.

Board of ex'rs-in-chief.

In Matter of Appl'n of GREAVES for pat. for condensing carding engines. Filed Oct. 5, 1872.

GENTLEMEN: If you could give immediate official action in this case it would greatly convenience the applicant, as he has now pending a suit in the U. S. circuit court, E. D. of Pa., against certain infringers of his rights; into which suit it will be absolutely necessary for him to introduce this patent, if allowed. The suit has been stayed to await your decision herein. The patent will thus be immediately tested upon its issue.

It is from no desire to secure a hasty action that I write, but simply that, if you have arrived at a concension which is favorable, we may press the suit.

I enclose the amendment which you requested me to make.

Yours very resp'y, GEORGE E. BUCKLEY, *Att'y*

PHILADA., 204 So. 5TH, *Dec.* 14, 1876.

In the United States Patent Office.

Before the board of examiners-in-chief on appeal.

In Matter of Appl'n of JAS. GREAVES for letters patent for imp't in condensing carding engines. Filed Oct. 5, '72.

149 Applicant hereby amends above matter by inserting on the 9th page of the specification, between the word "bearing," on the 2d, and the word "and," on the third lines thereof, these words, to wit:

Inserted Feb. 9, 1877.

said bearing and said shaft or spindle being of cast iron or of A metal of the same crystalline structure,

Respectfully submitted,

GEORGE E. BUCKLEY, *Att'y.*

Approved.

R. H. DUELL, *Com.*

PHILADA., 204 So. 5TH, *Jan'y* 8, 1877.

In Matter of Appl'n of GREAVES for letters patent for "spindles." Filed 1872. Room 93.

Comm'r of Patents.

SIR: On appeal, this case has been allowed on two claims, and after one month's delay no letter of allowance or other official action has been had.

A letter of allowance is requested.

Very resp'y, GEORGE E. BUCKLEY, *Att'y.*

150 (Interference.) (No. 14.)

Copy sent Jan. 12, 1877. M. McB.

DEPARTMENT OF THE INTERIOR, U. S. PATENT OFFICE, WASHINGTON, D. C., *Jan'y* 11, 1877.

James Greaves, care Geo. E. Buckley, 204 So. 5th St., Phila., Pa.:

Please find below a copy of a communication from the examiner concerning your appl'n for a patent for condensing cylinders for carding engines, dated the 5th day of Oct., 1872.

Very respectfully,

——— ———,

*Commissioner of Patents.*

Room No. 93.

Your case, above referred to, is adjudged to interfere with app'n of Joseph M. Stone, of North Andover, Mass., for rubbing-rollers for carding machines, filed Jan'y 21, 1873 (Wm. C. Hibbard, Boston, Mass., att'y), and the question of priority will be determined in conformity with the rules accompanying this. The preliminary statement demanded by rule 53 must be sealed up and filed on or before

the tenth day of February, 1877, with the subject of invention and name of party filing it endorsed on the envelope. The subject-matter involved in the interference is—

1st. The combination, in a carding engine, of a condensing or rubber cylinder, a driving wheel, and a polygonally shaped horizontal shaft or spindle, the latter being adapted to be revolved and at the same time to be continuously reciprocated in a correspondingly polygonally shaped bearing, said bearing and said shaft
151 or spindle being of cast iron or of metal of the same crystalline structure, and a continuously reciprocating rubber, substantially as and for the purposes described.

2d. In a carding engine, the combination of a continuously reciprocating rubber, a driving wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast iron or both of metal having the same crystalline structure, whereby in the reciprocating action the tendency of the crystalline particles of cast metal in the bearings to wear the spindles will be resisted by the crystalline particles of the latter, substantially as and for the purposes described.

WM. H. APPLETON, *Examiner.*

Room No. 93.

Copy sent
Feb. 9, 1877.
M. McB.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *February* 8, 1877.

Condensing cylinder for carding engines. Filed Oct. 5, 1872.

James Greaves, care of Geo. E. Buckley, Philadelphia:

In the matter of the interference between the applications of James Greaves and Joseph M. Stone, the motion made by the said Greaves to dissolve the same on the 5th instant has been refused.

WM. H. APPLETON, *Examiner.*

152 WASHINGTON, D. C., *Feb'y* 9, 1877.

Matter Appl'n of GREAVES — imp't in spindles. Filed Oct. 5, 1872.
Room 91.

Comm'r of Patents.

SIR: Applicant hereby amends above matter by inserting between the words "structure" and "and," (before the comma) ∧ in the 1st clause of claim, the words

as cast iron.

Also by the insertion of the same words between the words "structure" and "whereby" (before the comma), in the 2d clause of claim.

Respectfully submitted,

GEORGE E. BUCKLEY,
*Att'y for Greaves.*

App'd.

W. H. DOOLITTLE,
*Ass't Com's'r.*

Feb. 9, 1877.

Room No. 93.

Copy sent
Feb. 10, 1877.
M. McB.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Feb'y* 10, 1877.

"Condensing cylinder for carding engines." Oct. 5, 1872.

James Greaves, care Geo. E. Buckley, 204 So. 5th St., Phila., Pa.:

In the matter of the interference declared by the primary examiner between the applications of Joseph M. Stone and your-
153 self, you are hereby notified that said interference has been dissolved by direction of the Commissioner.

WM. H. APPLETON, *Examiner.*

Book containing Com'r's dec. herein referred to.

Enclosed in letter of April 27, 1877.

WASHINGTON, D. C., *Apr.* 27, '77.

In Matter Patent of JAS. GREAVES for condensing cylinder for carding engines. Feb'y 20, 1877.

And now, to wit, April 27, 1877, the Commissioner of Patents orders that the names of the attornies now upon the record original drawings in above case be removed therefrom and the name of the attorney who was such at time of granting the above patent be substituted therefor.

WASHINGTON, D. C., *Apr.* 27, '77.

In Matter of Patent of JAS. GREAVES for condensing cylinder for carding engines. Feb'y 20, 1877.

Comm'r of Patents.

SIR: Upon examining the record in the above case there appears to have been inserted therein by a firm of patent attornies a long statement. These gentlemen are not attornies in the case, and have no authority therein. The bulk of the document is entirely impertinent to its pretended object, and it is respectfully requested that it be removed from the said record and the enclosed order of the Comm'r inserted in lieu thereof.

Respectfully submitted,

GEORGE E. BUCKLEY,
*Att'y of Record.*

154 In the Matter of Patent of JAMES GREAVES.

Geo. E. Buckley protests against admittance of protest of Howson & Son into files of this case, and requests that their names be removed from the drawings.

Request denied. See letter of ass't Comm'r, May 2, 1877.

U. S. PATENT OFFICE.

*Application of James Grieves. Filed Sept. 30, 1872.*

Contents of this file.

1. Application.
2. Letter, Oct. 29, '72.
3. Att'y to office, Dec. 6, 1872.
4. Brief, Dec. 7, '72.
5. Amendment, Dec. 7, 1874.
6. Office to applicant, Dec. 9, '74.
7. Amendment, Jan. 20, '75.
8. Office to applicant, Jan. 20, '75.
9. Office to applicant, Jan. 27, '75.
10. Letter, Feb. 8, 1875.
11. Office to applicant, Feb. 26, '75.
12. Letter, Mar. 18, 1875.
13. Office to applicant, Mar. 31, ——.
14. Power of att'y to Geo. E. Buckley.
15. Letter to Office, Sept. 5, ——.
16. Letter, Sept. 14, 1876.
17. Amend't, Oct. 12, 1876.

155 18. Rejection, Nov. 27, 1876.

19. Sub. specu., Nov. 29, 1876.
20. Rejected Dec. —, ——.
21. Amendment, Dec. 15, ——.
22. Letter — inquiry, Ja. —, ——.
23. Letter, Feb'y 8, 1877.
24. Amendment, Feb'y 9, 1877.
25. Letter, Feb'y 10, 1877.

1872. 187

No. 187,620. 684

James Greaves,

Of Philadelphia,
County of "
State of Pennsylvania.

Condensing cylinders for carding engines.

Rec'd Sept. 30, 1872.
Petition, " "
Affidavit, " "
Specification, Oct. 5, "
Drawing, Sept. 30, "
Model, " "
Add. model, Jan'y 20, 1875.
Cert. dep., —— —, ——.
Cash, $15, Sept. 30, 1872.
Add'l fee cert., —— —, ——.
" " cash, $20, Feb. 16, 1877.
Examined Feb. 12, 1887. Wm. H. Appleton.

Reissued Nov. 23, 1880. No. 9477, Div. B.
Reissued March 7, 1882. No. 10054, Div. A.

Issue, Feb'y 13, '77. Lockwood.
156 Patented Feb. 20, 1877.
Circular, Feb'y 13, 1877.

[HOWSON & SON,
Present.]*

GEO. E. BUCKLEY,
*Att'y, Phila., Pa.*

1877.

*Contents.*

Application, 1 paper.
1. Rej. Oct. 29, 1872.
2. Rej's, Dec. 7, 1872.
3. Letter, Dec. 9, 1874.
4. Letter, Jan. 20, 1875.
5. Rej., Jan. 27, 1875.
6. Rej., Feb. 26, 1875.
7. Rej., 2d, Mar. 31, 1875.
8. Rej. by board, Aug. 7, 1875.
9. " " Com'r, Nov. 11, 1875.
10. Letter, Sep. 14, 1876.
11. Rej., Nov. 27, 1876.
12. Rej., Dec. 1, 1876.
13. Letter (ans. to appeal), Dec. 2, 1876.
14. Intf. with app'n $\frac{197}{78}$, Jan. 11, 1877.
15. Letter, Feb. 8, 1877.
16. Letter dissolving intf., Feb. 10, 1877.
17.
18.

Title: Improvement in condensing cylinders for carding engines.

157 DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the decision of the Commissioner, dated November 11, 1875, in the matter of the application of James Greaves, filed October 5, 1872, for imp't in condensing cylinders for carding engines.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 17th day of October, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

[L. S.] E. M. MARBLE,
*Commissioner.*

* Words enclosed in brackets erased in copy.

In the Matter of the Application of JAMES GREAVES for letters patent — "improvement in condensing cylinders for carding engines."

Appeal from the examiners-in-chief.

Precisely the same subject-matter brought before me upon this appeal was brought in the case of Joseph M. Stone, decided on the 14th day of June last.

I see no reason now for recalling the decision made in that case. The conditions under which this square or prismatic shaft is used are precisely the same as those in the patent of Warth, August 6th, 1872, "machines for cutting cloth." All that can be said is that the reciprocating movement in this case is more rapid and by
158 consequence the wear greater than in that, but this seems to me merely a matter of degree. There would be wear in the Warth machine resulting from the reciprocating and rotary movements. The rotating bearing in which the shaft reciprocates must press in its rotation against the sides of the shaft near the angles, and the tendency to wear would be the same in kind, though different in degree. The device in applicant's apparatus is the same as that used in Warth's, and with the same result in kind, though not in degree.

I do not see that this applicant, in thus applying an old device to an old purpose, has made any invention, and must affirm the decision of the examiners-in-chief.

ELLIS SPEAR,
*Acting Commissioner.*

Nov. 11th, 1875.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the examiner's answer to reasons of appeal, dated December 2, 1876, in the matter of the application of James Greaves, filed October 5, 1872, for improvement in condensing cylinder for carding engines.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 17th day of October, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

[L. S.]

E. M. MARBLE,
*Commissioner.*

159 Before the hon. the board of appeals.

In the Matter of the Application of JAS. GREAVES for a patent for an alleged improvement in condensing cylinders for carding engines. Filed Oct. 5th, 1872.

*Answer to Reason of Appeal.*

This case has already been before the honorable the board of examiners-in-chief and the Commissioner on appeal from the decision of the primary examiner rejecting the case on certain references, and both of said appellate tribunals have affirmed the examiner's decision.

At the request of the appellant, the case has been reopened by the Commissioner and by him returned to the examiner for the consideration of certain new claims presented by the appellant.

The claim passed upon by the examiner, board of ex'rs-in-chief, and the Commissioner was as follows:

"The combination, substantially as described, of the condensing cylinder of a carding engine, the driving wheel A, the hub of which has a square or angular aperture, and the spindle X, having a corresponding shape imparted to that portion of it which slides through the said hub, all as set forth."

The claims now presented are as follows:

(Interlineations inserted in pencil on original record.)

"1st. The combination, in a carding engine, of a condensing or rubber cylinder, a driving wheel, and a polygonally shaped horizontal shaft or spindle A (of cast iron,) the latter being adapted to be revolved and at the same time to be continuously reciprocated in a correspondingly polygonally shaped bearing, A (also of cast iron,) and a continuously reciprocating rubber, substantially as and for the purposes described."

160 "2d. In a carding engine, the combination of a continuously reciprocating rubber, a driving wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast iron or both of metal having the same crystalline structure, whereby in the reciprocating action the tendency of the crystalline particles of cast metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter, substantially as and for the purposes described."

The first of these last-mentioned claims, when stripped of all unnecessary verbiage, will be found to be the same in substance as that already passed upon by the Commissioner, since the appellant has merely set forth the facts that the spindle is horizontal, and that it has certain movements imparted to it, all of which was implied in the claim before decided, and the question of patentability involved in such claim must be considered, so far as the examiner is concerned, as *res adjudicata*.

The second claim, as now drawn, covers subject-matter some-

what different from that embraced in any of the claims which have preceded it, the point of difference being that the spindle and the bearing through which it reciprocates are both made from cast iron or cast metal having the same crystalline structure, &c.

English patent, No. 13027 (old law), to Leigh shows a cast-iron spindle working in a bearing made of similar material.

In this reference the patentee states that the objects to be attained by making spindles of cast iron instead of steel, as heretofore,
161 are the rendering them more durable and the reduction of the cost of manufacturing the same. These are the advantages claimed by appellant as possessed by his spindle.

As the particular properties which appellant now claims to have discovered are shown by the said references to have been well known long before the date of the alleged invention, and as the Hon. Commissioner, as well as the hon. board of examiners-in-chief, in this and in another pending case for precisely the same devices as are now claimed, have already decided that appellant's construction possesses no patentability over the references heretofore cited, the examiner therefore urges that the substitution of the cast-metal shaft for the wrought-metal or steel shaft heretofore employed required no invention.

Respectfully submitted,

WM. H. APPLETON, *Examiner.*

U. S. Patent Office,
Dec. 2d, 1876.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the decision of the examiners-in-chief in the matter of the application of James Greaves, filed October 5, 1872, for improvement in spindles.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 17th
162 day of October, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

[L. S.]

E. M. MARBLE,
*Commissioner.*

No. 3106. U. S. PATENT OFFICE, *Dec.* 15, 1876.

Before the examiners-in-chief on appeal.

Application of JAMES GREAVES for a patent for an improvement in spindles. Filed October 5, 1872.

The real invention is in providing against the cutting away of metal by the great friction between the bearing and the shaft which has the rapid rotating and reciprocating action by combining

metals of the same crystalline structure as cast iron in shaft and bearing.

The shape of the hole for the bearing and the corresponding shape of the shaft are of little importance, since the same device has long been used as equivalent to spline or feather for similar purposes.

The former actions of the office were based upon claims for the latter feature, and though the square or polygonal-shaped bearing and spindle may have advantages over the spline for the reasons stated by applicant, yet it seems to involve nothing more than mere selection.

But when applicant combines the cast-iron feature of bearing and spindle with their rotating and reciprocal motions and their square or polygonal forms we have a different matter.

The statements of applicant in regard to the great evils attending the rapid cutting away of the spindle all stand admitted.

163 The remedy he applied was novel and important in that class of machines. He experimented to arrive at his results, and it was only when he had thrown aside the spline and adopted the polygonal or square hole and spindle and had thrown aside steel and all other metals but cast iron that he achieved success and procured a bearing and spindle that defied the cutting of the friction.

The results following are also to be considered in determining patentability.

The references nowhere show a joint of this kind having the sliding and revolving action, and nothing is referred to where the same necessity existed for guarding against this rapid cutting by friction, and the results attained in this case—the cheapening of the construction, while at the same time producing a better machine and one that could be run for a year and a day instead of breaking down and standing idle for repairs monthly—are also admitted.

We think the case of Treadwell *vs.* Parrott, 3 Fisher, 130, is in point and settles the question of patentability in applicant's favor.

The first claim, as it stands, is properly rejected, but if amended to include the "cast iron or metal of the same crystalline structure" for bearing and spindle we think it would be admissible, so far as anything appears.

The decision of the examiner is affirmed as to the first and reversed as to the second claim, as the case stands.

R. L. B. CLARKE,
V. D. STOCKBRIDGE,
*Examiners-in-Chief.*

164 DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the decision of the Commissioner, dated February 9,

1877, in the matter of the interference of Joseph M. Stone vs. James Greaves for imp't in carding engines.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 17th day of October, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

[L. S.] E. M. MARBLE,
*Commissioner.*

Before the primary examiner.

In the Matter of the Interference between the respective applications of JOSEPH M. STONE and JAMES GREAVES for patent for certain improvements in carding engines.

This is a motion on the part of the attorney for Greaves for a dissolution of the interference which was declared by the primary ex'r between the applications above noted on the 11th ulto., and the grounds upon which such dissolution is asked are stated by the said attorney to be as follows:

1st. "The subject-matter of the said two applications is different.

165 2d. "There is no subject-matter in the application of Stone which had not been adjudged by the Patent Office to be old in the arts.

3rd. "The only subject-matter adjudged by the Patent Office to be novel is not common to both applicants."

4th. On a comparison of the two applications it is found that they do not interfere.

The invention of Greaves, which forms the subject of this interference, is as follows:

"1st. The combination, in a carding engine, of a condensing or rubber cylinder, a driving wheel, and a polygonally shaped horizontal shaft or spindle, the latter being adapted to be revolved and at the same time to be continuously reciprocated in a correspondingly polygonally shaped bearing, said bearing and said shaft or spindle being of cast iron or of metal of the same crystalline structure, and a continuously reciprocating rubber, substantially as and for the purposes described.

"2nd. In a carding engine, the combination of a continuously reciprocating rubber, a driving wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast iron or both of metal having the same crystalline structure, whereby in the reciprocating action the tendency of the crystalline particles of cast metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter, substantially as and for the purposes described."

These claims were allowed by the honorable board of examiners-in-chief.

166 An inspection of the drawings and models in the two cases shows that the construction of parts, aside from the material of which they are composed, is precisely the same in each, and this fact, I believe, is admitted by both parties, so that the only question to be considered is whether or not the two applications disclose the same invention, so far as the materials employed is concerned.

Greaves, in his application, states that while his spindle or shaft is made polygonal in shape in cross-section and the bearing through or in which it operates of the same shape, they possess also the additional feature of being made of cast iron or the two parts of metal having the same crystalline structure. This last feature constitutes the gist of his invention, and is the feature which he claims is not shown in the Stone case.

The model which Stone filed with his case shows a shaft or spindle formed of cast brass, but the gear or bearing through or in which it operates is missing, having been lost from the model since filing in the office. As there is no mention in the Stone specification as to what the material is of which the missing part is composed, the only way to show that fact is by his sworn statement. Should it appear from such a statement that the missing part was composed of cast brass, then it is held that the two cases in question interfere, since cast brass has a crystalline structure, and the two parts, spindle and bearing, being formed of such a material, would come fully within the scope of Greaves' claims. On the other hand, should Stone, by his statement, establish the fact that the bearing or gear (the missing part) was made from cast iron, then again there would be a clear interference, since he states in his specification that
167 by the construction of the parts claimed (spindle and bearing) the spindle can be made from cast iron, and, as it is a matter of public notoriety that the gears employed on this class of machines are invariably made from cast iron, it may be proven that the missing part was made of the same metal.

Viewed, then, in the light of the above suggestions, the examiner believes that the two applications are properly joined, and must accordingly refuse the motion.

WM. H. APPLETON, *Examiner.*

U. S. Patent Office, Feb'y 8, 1877.

Endorsed.

An interference must exist and be declared only upon what appears in the conflicting applications, and not on what may arise on a subsequent extraneous statement which may or may not be made.

As cast brass has not the same crystalline structure as cast iron, the application of Greaves, if so amended in its claims as to restrict him to the use of metal having the same crystalline structure "as cast iron," will not interfere with an application showing and describing "cast brass," if the material is of the essence of the invention.

Upon Greaves making the amendment suggested the interference will be dissolved.

W. H. DOOLITTLE,
*Ass't Com'r.*

Feb. 9, 1877.

168 DEFENDANT'S EXHIBIT 4.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file wrapper and contents in the matter of the reissue letters patent granted James Greaves March 7, 1882, number 10054, for improvement in condensing cylinder for carding engines.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this fifteenth day of September, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

[L. S.] E. M. MARBLE,
*Commissioner.*

"Division A."

To the Commissioner of Patents:

Your petitioner, James Greaves, of Philadelphia, Pennsylvania, prays that he may be allowed to surrender the letters patent for an improvement in condensing cylinders for carding engines granted to him February 20, 1877, whereof he is now sole owner, and that letters patent may be reissued to him for the same invention upon the annexed amended specification. Accompanying this petition is an abstract of title, duly certified, as required in such cases.

JAMES GREAVES.

169 STATE OF PENNSYLVANIA, } ss:
*City and County of Philadelphia,* }

James Greaves, the above-named petitioner, being duly sworn, deposes and says that he verily believes that, by reason of an insufficient or defective specification, his aforesaid letters patent are inoperative or invalid; that the said error has arisen from inadvertence, accident, or mistake and without any fraudulent or deceptive intention, to the best of his knowledge and belief; that he is the sole owner of said letters patent, and that he verily believes himself to be the first and original inventor of the improvement set forth and claimed in this amended specification.

JAMES GREAVES.

Signed, sworn, and subscribed before me this 12th day of March, A. D. 1877.

[L. S.] W. W. DOUGHERTY,
*Notary Public.*

To all whom it may concern:

Be it known that I, James Greaves, of Philadelphia, State of Pennsylvania, have made certain new and useful improvements in condensing cylinders for carding engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings making part hereof:

My invention consists in the combination, in a carding engine, of a condensing cylinder, a driving wheel, and a polygonally shaped horizontal shaft or spindle, the latter being adapted to be revolved and at the same time to be continuously reciprocated in a correspondingly polygonally shaped bearing, and a continuously reciprocating rubber, substantially as hereinafter set forth.

Substitute "A," May 9, 1877.

170

This invention relates to condensing carding engines which have a reciprocating motion imparted to the rubbers. The shaft or spindle is horizontal, and, in addition to the work it has to perform, it is required by its position to sustain its own weight upon its sides, which alone tends to wear them. Some difference will, of course, result from the dirty or cleanly character of the work done by the carding engine, but nine months is the average extreme limit of the use of ordinary round feathered spindles. The wear of these shafts or spindles causes the reciprocating rubbers of the card to be untrue with respect to each other, thus occasioning the ruin of the work done by them and frequent breakage of that part of the apparatus.

The object of my invention is to overcome these difficulties and objections by making a more durable shaft or spindle, which I accomplish by making the spindle or shaft of such polygonal form, dispensing with a feather, as to distribute the wear occasioned by having to sustain its own weight and the work it has to do evenly over several parts of its sides or surface.

I have found, after several years' use, that my shafts or spindles so constructed are very little worn, and have faithfully and continuously worked during all that period.

On all kinds of work the adoption of my improved spindle has resulted in a saving of from twenty-five to fifty-four dollars per year upon each carding engine to which they have been applied.

171

The shaft or spindle of a condensing or rubbing cylinder for carding engines consists ordinarily of a light shaft or bar, to which the cylinder of tinned plate is soldered or otherwise secured. This bar, being turned by a pinion at one end, turns the rubber at its other end, thus forming a horizontal connecting shaft, commonly called a "spindle." The rubber has a rapid reciprocating motion at the same time that it is revolving rapidly upon its axis.

In the drawings—

Figure 1 shows a side view of my polygonal shaft or spindle (square), showing also a part of the rubber and the pinion in which the shaft or spindle reciprocates.

Figure 2 is the cross-section of the shaft or spindle in the bearing in which it reciprocates.

A is the pinion which turns the shaft or spindle X, and in the centre, *b*, of which the latter reciprocates. C is the reciprocating rubber. The square shaft X is adapted to a square hole in the hub of the driving wheel or pinion A, which wheel or pinion drives the shaft or spindle.

The delay and trouble of removing the shafts or spindles when worn out is a source of much annoyance and expense, as the detaching of the tin cylinder and securing them to new spindles requires tedious manipulation.

I make that part of the spindle which reciprocates upon or in its bearing of a polygonal shape in cross-section rather than to make it round, as by the former shape the wear is evenly distributed to the corners of the polygonal sides. When the shaft or spindle is square or polygonal its bearing in which it reciprocates must, of course, be of corresponding shape.

I am well aware that an upright square spindle has been used in spinning-frames, as in English patent No. 2885, of
172 1856; also that in cloth-cutting apparatus a triangular shaft extendable lengthwise in its bearings has been used. These I do not claim; but—

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

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Substitute "B," May 9, 1887.

The combination, in a carding engine, of a condensing or rubber cylinder, a driving wheel, and a polygonally shaped horizontal shaft, the latter being adapted to be revolved and at the same time to be rapidly and continuously reciprocated in a correspondingly polygonally shaped bearing, and a continuously reciprocating rubber, substantially as and for the purposes described.

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JAMES GREAVES.

Witnesses:
ALBERT E. ZACHERLE.
GEORGE H. SONNEBORN.

THE UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that a careful search has been made of the Digest of this office, and no assignment, agreement, license, power of attorney, or other instrument of writing is found of record under or relating to letters patent granted to James Greaves February 20th, 1877, No. 187,620, for "condensing cylinders for carding engines."

In testimony whereof I, W. H. Doolittle, acting Commissioner of

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Words and sentences enclosed between rules erased in copy.

Patents, have caused the seal of the Patent Office to be here-
173 unto affixed this twentieth day of March, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and first.

[L. S.] W. H. DOOLITTLE,
*Acting Commissioner.*

DIVISION "A AND B."

PHILADA., *M'ch* 27, 1877.

In the Matter of the Application — JAMES GREAVES for reissue of letters patent for condensing cylinders for carding engines. Filed Mch. —, ——.

Hon. Comm'r of Patents.

SIR: Enclosed herewith please find power of attorney, which please file in above cases.

Yours very truly, GEORGE E. BUCKLEY,
Per A. E. Z.

*Power of Attorney.*

To the Commissioner of Patents:

The undersigned having, on or about the 19th day of March, A. D. 1877. made applications for reissue of letters patent to him, of Feb'y 20, 1877, No. 187,620, for condensing cylinders for carding engines, hereby appoints George E. Buckley, of Philadelphia, Pennsylvania, his attorney, with full power of substitution and
174 revocation to prosecute said application, to make alterations and amendments therein, to receive the patents, and to transact all business in the Patent Office connected therewith.

Signed at Philadelphia, Pennsylvania, this 24th day of March, A. D. 1877.

JAMES GREAVES.

Copy sent April 3, 1877.—M. McB.

Room 93.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *April* 2, 1877.

Condensing cylinders for carding engines. Div. A. (Reissue.) Mar. 15, 1877.

James Greaves, care of Geo. E. Buckley, 204 So. 5th St., Phila., Pa.:

This application has been examined, and is rejected upon reference to Harraday, No. 10986, May 30, 1854; Warth, 130,343 and 130,344, Aug. 6, 1872 (cloth cutting), and English patent No. 2885, of 1856.

The matter involved in this claim was decided adversely to appli-

cant, upon appeal, by the board of examiners-in-chief and Commissioner in his original application.

W. H. APPLETON, *Examiner*,
Per MASON.

175 WASHINGTON, D. C., *April* 17, 1877.

In Matter Appl'n GREAVES for reissue. Div's- A. Filed March 15, 1877.

Comm'r of Patents.

SIR: Applicant respectfully urges, in answer to the references cited in above case—

1st. That the combination of applicant accomplishes a new result, a better result, in the improved value of goods worked by his device over those worked by old methods.

2d. That it saves in the cost of running carding machines, in that it removes the necessity for constant repair and change of spindle.

3d. That it is new when compared with the references, in that it is used in a new combination with the parts of which it co-operates, and the result of the combination is an improvement to the trade and a (material) A cheapening of the cost and perfection of the product.

4th. That it equalizes the wear upon the spindle, and, as a medium for communicating motion to the horizontal rubber roll, is materially better adapted for the purpose than a spindle with a feather (the old method), which is upon one side. The latter has a constant tendency to throw the rub-roll out of the space in which it revolves, while the several corners of the present spindle (applicant's) (tends to) A retain the rub-roll there, since the force applied to revolve the roll is applied at various points around the circle of its interior; and, in view of this fact and the (peculiar) A machine A and (in which it is used) combination of the spindle with other parts and its conditions, the action is different.

176 The action of the feather tends to throw the rub-roll off in a line tangential to the (curved) A line in which it is desired to revolve it. Therefore the greatest wear is at points *a* and *b* of the figure.

In applicant's device one corner of the spindle corrects the tendency of the other to do this thus, and the wear is equally distributed, resulting in equalized wear of spindle and bearing and truth and parallelism in the action of each rub-roll with its neighboring rub-rolls.

The references cited do not show the same conditions nor the same action. The results are not the same, and it is respectfully requested that the office will (therefore) A reverse its action.

Respectfully submitted,

GEORGE E. BUCKLEY, *Att'y.*

Copy sent April 19, 1877.—M. McB.

Room No. 93.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *April* 19, 1877.

Condensing cylinder for carding engines. Div. A. (Reissue.) March 15, 1877.

James Greaves, care Geo. E. Buckley, 204 S. Fifth St., Phila., Pa.:

Applicant's communication of April 17th inst., in regard to above-named application, has been carefully considered; and,
177 failing to discover any invention over before-cited references, a patent is finally refused.

WM. H. APPLETON, *Ex'r*,
Per MASON.

AP. 23, '77.

In U. S. Patent Office.

In Matter Appl'n of GREAVES for reissue.

James Greaves, of Philadelphia, State of Pennsylvania, being duly sworn, doth depose and say that the square spindle described and claimed in his application for reissue, "division A," has been used continuously A since his first application, in October, 1872, by the following parties, to wit: Holt & Fitzpatrick, of Manayunk, Philadelphia, in the State of Pennsylvania; James Stafford, of the same place; Thomas Schofield, of the same place; Seville Schofield, of the same place; Beswick & Hay, of Philadelphia; Bruner & Sons, of Philada.; James Ledward & Son, of Chester, Pennsylvania; John Maxson, of the same place; Shaw & Ezry, of the same place; John Bromley & Sons, of Philadelphia; by Hammedown, of Philadelphia, and by others whose names he does not at present recollect; that his square spindles, he is informed and believes, are used in three or four hundred mills in the United States.

JAMES GREAVES.

Sworn to and subscribed before me this 23d day of April, A. D. 1877.

[L. S.] W. W. DOUGHERTY,
*Notary Public.*

178 WASHINGTON, *May* 9, 1877.

In Matter Appl'n GREAVES for reissue letters patent for imp't in condensing cylinders, &c., div. A.

Comm'r of Patents.

SIR: Applicant desires that the above case may be withdrawn from appeal to admit of the following amendments, to wit:

The erasure of the last eight written lines, commencing "my invention consists," &c., A of page 1 of the speci-

fication, and the substitution therefor of the following words:
in lieu thereof,

By adding A [after the last written line of page 3, these words, viz:]*

The nature of my invention is as follows, viz:

"A." My invention consists, in a carding engine, of a condensing or rubber cylinder mounted on a polygonally shaped horizontal shaft, in combination with a driving gear having a sleeve-shaped bearing, said shaft or cylinder being adapted to be revolved by the said driving gear, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes hereinafter set forth.

Also amend by erasing the present clause of claim, and by substituting therefor this clause, to wit:

"B." In a carding engine, a condensing or rubber cylinder mounted on a polygonally shaped horizontal shaft, in combination with a driving gear, A, having a sleeve-shaped bearing, *b*, said shaft and cylinder being adapted to be revolved by the drive wheel A, and at the
179 same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described.

Respectfully submitted,

GEORGE E. BUCKLEY, *Att'y.*

Room No. 93.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *May* 24, 1877.

Reissue. Div. A. Condensing cylinders for carding engines. March 15, 1877.

James Greaves, care Geo. E. Buckley, 204 So. 5th St., Philadelphia, Pa.:

Application considered with reference to special amendment of May 9th inst., which, presenting matter the same in substance as that for which it was substituted, does not relieve the case from the references before cited, and it is therefore again rejected.

WM. H. APPLETON, *Examiner.*
MASON, *Ass't.*

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* Words enclosed in brackets erased in copy.

WASHINGTON, D. C., *May* 24, '77.

In U. S. Pat. Off.

In Matter Appl'n GREAVES for reissue of letters patent for imp't in condensing cylinders of carding engines. Div. A. Room 93.

Comm'r of Patents.

SIR: I hereby renew the appeal in above case.

Very resp'y, GEORGE E. BUCKLEY,
*Att'y for Greaves.*

180 Before the honorable board of appeals.

In the Matter of the Application of JAMES GREAVES, filed March 15, 1877, for the reissue of letters patent No. 187,620, dated Feb'y 20, 1877, for condensing cylinders for carding engines.

*Examiner's Answer to Renewal of Appeal.*

The above-mentioned application was appealed from the primary examiner, and reasons filed April 27th ult.

Answer was made to reasons of appeal May 2 inst. The appeal was withdrawn and the case remanded to primary examiner for consideration of special amendment May 9th inst.

No material change was effected by this amendment, none that would relieve the case from the references before cited, the claim and statement of invention being merely changed in phraseology, particularly in regard to the "sleeve-shaped bearing."

The references before given and the examiner's answer to reasons of appeal apply with equal force to the present status of the case as they did when it was originally appealed.

This additional resumé is respectfully submitted.

U. S. Patent Office, May 24, 1877.

WM. H. APPLETON, *Examiner.*

181 (Interference.) DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *July* 19, 1877.

James Greaves, care Geo. E. Buckley, 204 So. 5th St., Phila., Pa.:

Please find below a copy of a communication from the examiner concerning your application for reissue of patent No. 187,620, granted to you Feb'y 20, 1877, said reissue application being dated the 24th day of March, 1877, for condensing cylinders for carding engines.

Very respectfully, ELLIS SPEAR,
Per W. H. A.

Room No. 93.

Your case, above referred to, is adjudged to interfere with the application of Joseph M. Stone, of North Andover, Mass., for rub-

bing-rollers for carding machines, filed Jan'y 21, 1878, and the question of priority will be determined in conformity with the rules accompanying this. The preliminary statement demanded by rule 53 must be sealed up and filed on or before the 18th day of August, 1877, with the subject of invention and name of party filing it indorsed on the envelope. The subject-matter involved in the interference is—

"In a carding engine, a condenser or rubber cylinder mounted on a polygonally shaped horizontal shaft, in combination with a driving gear having a sleeve-shaped bearing, said shaft and
182 cylinder being adapted to be revolved by the drive wheel, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described."

The att'y for said Stone is Wm. C. Hibbard, Boston, Mass.

WM. H. APPLETON, *Examiner.*

*Interlocutory Appeal.*

In the Matter Appl'n of GREAVES for reissue of letters patent for imp't in condensing cylinders, etc.

Comm'r of Patents.

SIR: I hereby appeal from the action of the primary examiner placing above app'n in interference with that of Stone, because—

1. That Greaves' appl'n is for the reissue of a patent whose term is now running towards expiration.

2. That Stone's case has been rejected, and is abandoned because the official action necessary under the law to keep the case alive was not had after the official action thereon in 1875.

3. That under the law there is no interference.

Very respectfully, GEORGE E. BUCKLEY, *Att'y.*

July 20, 1877.

183 Before the honorable Commissioner of Patents.

In the Matter of the Interference between the Application of JAMES A. GREAVES for reissue of letters patent No. 187,620, granted to him Feb'y 20, 1877, for improvement in condensing cylinders for carding engines, filed Mar. 24, 1877, and the Application of JOSEPH M. STONE for a patent for a similar invention, filed Jan'y 21, 1873.

*Examiner's Demurrer to Interlocutory Appeal.*

Appeal is taken to your honor from the decision of the examiner in declaring an interference between the applications above noted.

Without entering into a discussion of the merits of the case, excepting in so far as to remark that there has been the proper action in the Stone case within the last two years to keep it alive or relieved from the accusation of abandonment, the examiner submits

that there has been no action taken from which an appeal lies to your honor. Rule 59, office rules of practice, provides that after the declaration of an interference and before the time for filing the preliminary statement has expired motion to dissolve the same on the ground of lack of novelty, or that no interference in fact exists, or that there has been such other irregularity in declaring the same as will preclude the proper determination of the question of right between the parties, must be made before the examiner by whom the interference was instituted; and a prerequisite to all this is that the opposing parties must have proper notice of the
184 motion, as required by rule 50. In the present case there has been no motion whatever before the examiner to dissolve the interference, nor has the necessary notice been served upon the opposing parties; but, without taking such action, the present appeal is taken direct to your honor, with the request that the interference be dissolved and the patent to Greaves allowed to pass to issue.

This action is manifestly without the sanction of any rule of practice in this office, and it is respectfully recommended that the appeal in question be dismissed and the appellant required to pursue the course pointed out in the rules of practice.

Respectfully submitted,

WM. H. APPLETON, *Examiner.*

U. S. Patent Office, July 20, 1877.

(Endorsed.)

It appears from an inspection of the papers that the case of Stone cannot strictly be held to be abandoned before the expiration of the two years, and applicant was notified that his application would be considered and such action taken as the nature of the circumstances should require. That letter having been written to him, summary action without any hearing of his application would be a hardship.

Further, the examiner represents that the former interference did not proceed to judgment. This being the case, applicant Greaves must proceed in the regular way and, if he desire a dissolution of this interference, make the proper motion and notify the parties as the rules require.

185 The appeal is dismissed, and examiner will so notify the applicant.

ELLIS SPEAR,
*Commissioner of Patents.*

July 23, 1877.

Copy sent July 23, 1877.—M. McB.

Room No. 93.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *July* 23, 1877.

Condensing cylinders for carding engines. Reissue. Div. A. Mar. 15, '77.

James Greaves, care Geo. E. Buckley, 204 So. 5th St., Phila., Pa.:

In the matter of the interlocutory appeal in the above-named case appellant is hereby notified that said appeal has been dismissed and the examiner instructed to require the regular course of procedure.

If applicant desires a dissolution of the interference it will be necessary to make the proper motion and notify the opposing parties, as the rules require.

WM. H. APPLETON, *Examiner*,
Per MASON.

186 Copy sent Aug. 13, 1877.—M. McB.

Room No. 93.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Aug. 13th*, 1877.

Condensing cylinders for carding engines.. Reissue. Div. "A." March 24, 1877.

James Greaves, care Geo. E. Buckley, No. 204 So. 5th St., Philadelphia, Pa.:

In the matter of the interference between the application of Joseph M. Stone for a patent for certain improvements in rubbing-rolls for carding engines, filed Jan'y 21, 1873, and the application of James Greaves for a reissue of letters patent No. 187,620, granted to him Feb'y 20, 1877, for a similar invention, the motion to dissolve the same, filed by the said Greaves on the 3d inst., has been overruled.

WM. H. APPLETON, *Examiner*.

Copy sent Oct. 29, 1879.—M. McB.

Room No. 93. Case A.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Oct.* 28, 1879.

Condensing cylinders for carding engines. (Reissue.) March 24, 1877.

James Greaves, care of Geo. E. Buckley, No. 204 So. 5th St., Philadelphia, Pa.:

Acting under the provisions of rule 59 of office practice

(edition of Aug., 1878), the examiner requested a suspension
187 of the interference proceeding in which this case is involved, which was approved by the Commissioner, for the purpose of citing a newly discovered reference.

English patent 1247, of 1863, is in full anticipation of the supposed invention contained in this case, and it is accordingly rejected thereon.

WM. H. APPLETON, *Examiner.*

WASHINGTON, D. C., *Nov.* 12, '79.

In the Matter of Appl'n of GREAVES for reissue of letters patent for imp't in rub-roll shafts of condensing carding engines. Room 93.

Comm'r of Patents.

SIR: The above application, having been rejected by the office, was appealed by the said applicant to the board of appeal. In said appeal he, by mistake, omitted to state the claim and the reference upon which it was rejected, and begs leave to amend said appeal as follows, viz:

By adding thereto—

*Rejected Claim of James Greaves.*

"In a carding engine, a condensing or rubber cylinder
1. mounted on a polygonally shaped horizontal shaft, in combination with a driving gear, A, having a sleeve-shaped bearing, B, said shaft and cylinder being adapted to be revolved by the drive wheel A, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described."

Respectfully submitted,

GEORGE E. BUCKLEY, *Att'y.*

188 Copy sent 5, 12, '81.—M. A. M.

Room No. 93.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Dec. 5th*, 1881.

Condensing cylinders for carding engines. Reissue. Div. A. Mar. 15, 1877.

James Greaves, care Geo. E. Buckley, Esq., No. 204 So. 5th St., Phila., Pa.:

The interference declared on the 19th day of July, 1877, between this application and the application of J. M. Stone, having been determined, this application has been returned to the examiner, with instructions to consider whether or not, in view of certain

recent decisions of the Supreme Court of the U. S., the same, in its present form, can properly be allowed. Under these instructions a consideration of the case has been had, and as a result thereof the examiner is clearly of the opinion that under the decisions of the Supreme Court of the U. S. in the cases respectively of Gia nt Powder Co. *vs.* California Powder Works, 15 O. G., 289; Leggett *vs.* Avery, 17 O. G., 445; Swain Turbine and Manufacturing Co. *vs.* Ladd, 19 O. G., 62, and Goodyear Dental Vulcanite Co. *vs.* Davis, 19 O. G., 543, the applicant is not entitled to the claim now preferred, said applicant having withdrawn a similar claim in his original application in order to obtain his original patent, and the present claim being for a different invention than that covered by the original patent. The application must accordingly be rejected, and, as it is understood that it is the intention of the applicant to prosecute the application further before the appellate tribunals
189 in order to facilitate the final adjudication of the case, this rejection may be considered final, if the applicant so elects, and he may proceed at once with an appeal to the board of examiners-in-chief.

WM. H. APPLETON, *Examiner.*

U. S. PATENT OFFICE,
WASHINGTON, D. C., *Feb'y* 14, 1882.

Assignment of one-half interest in patent No. 187,620 from James Greaves to John and James Dobson, dated April 23, 1877, and recorded April 26, 1877. M. 21, 391.

SCHUYLER DURYEE,
*Chief of Assignment Div.*

No other ass't appears of record up to and including Feb. 14, '82.

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Feb'y* 15, 1882.

James Greaves, ass'or, care Geo. E. Buckley, 204 S. Fifth St., Phila., Pa.

SIR: Your application for reissue of patent No. 187,620, for improvement in condensing cylinders for carding engines, has been examined and allowed.
190 The patent will be forwarded to you as soon as practicable in due order of business.

Very respectfully,

E. M. MARBLE,
*Commissioner of Patents.*

1877. Div. A.

No. 10054. Reissue V. 2455.

James Greaves, assignor of ½ to John Dobson and James Dobson, of same place,

Of Philadelphia,
County of "
State of Pennsylvania.

Condensing cylinders for carding engines.

Rec'd March 15, 1877.
Petition, " " "
Affidavit, " " "
Specification, " " "
Drawing, " " "
Abstract of title, " 24, "
Old patent, No. 187,620, Feb'y 20, 1877. (Oct. 5th, 1872.)
Cert. dep., —.
1. Cash, $30, March 15, 1877.
Examined Feb'y 13, 1882, ex'rs-in-chief, per W. H. Appleton.
2. Issue, Feb'y 15, '82, J. W. Babson.
Patented Feb. 20, 1877.
Reissued Mar. 7, 1882.
3. Circular, Feb'y 15, 1882.

GEO. E. BUCKLEY,
201 So. 5th St., Philadelphia, Pa.

191 1877.

*Contents.*

Application, 3 papers.
1. Power of attorney, Mar 29, 1877.
2. Rej. April 2, 1877.
3. Letter to office, April 17, 1877.
4. 2d rej., April 19, 1877.
5. Ans. to reasons of appeal, May 2, '77.
6. Special amend't, May 9, 1877.
7. Rej. May 24th, 1877.
8. Renewal of appeal, May 24, '77.
9. Supplemental ans., May 24, '77.
10. Letter of interference with app'n $\frac{197}{78}$, July 19, 1877.
P. S. req., Aug. 18, 1877.
11. Interlocutory appeal, July 20, 1877.
12. Letter, July 20, 1877.
13. Letter (Comm'r's decision), July 23, 1877.
14. Letter, July 23, 1877.
15. Letter, Aug. 13, 1877.
16. Rej. Oct. 28th, 1879.
17. Ans. to reasons of appeal, Nov. 13, 1879.
Rej. by Comm'r, Feb'y 6, 1880.
18. Rejected Dec. 5, 1881.
19. Answer to reasons of appeal, Jan'y 27, 1882.
Title: Improvement in condensing cylinders for carding engines.

192 DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:
This is to certify that the annexed is a true copy from the files of

this office of the examiner's answer to reasons of appeal in the matter of the reissue application of James Greaves, filed March 15, 1877, for condensing cylinders for carding engines.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 17th day of October, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

E. M. MARBLE,
[L. S.] *Commissioner.*

Before the honorable board of appeals.

In the Matter of the Application of JAMES GREAVES, filed Mar. 15, 1877, for the reissue of letters patent No. 187,620, dated Feb'y 20, 1877, for condensing cylinders for carding engines.

*Answer to Reasons of Appeal.*

This application for reissue presents the original patent in two divisions, the one in controversy being div. A, in which the following claim is presented:

193 "The combination, in a carding engine, of a condensing or
A, having a sleeve-shaped bearing, B,
rubber cylinder, a driving wheel, A and a polygonally shaped horizontal shaft connected to a cylinder and adapted to be re-
by the driver A,
volved A and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described."

This claim, in substance, was presented in the original application, rejected upon certain references, and the action of the primary examiner affirmed by both the honorable board of examiners-in-chief and the Commissioner.

After this the case was reopened by the Commissioner, at request of applicant, and new claims presented for the consideration of the primary examiner. One of these claims was the same in substance as one of the original claims, and, of course, was again rejected by the primary examiner upon the same references, and said action of the primary examiner in regard to this claim was again affirmed by the board upon appeal.

Now that applicant again seeks protection for this same claim under a reissue, the question of its patentability must be considered, so far as the examiner is concerned, as *res adjudicata*.

The references cited in last rejection, as well as the former ones, were Harraday, 10986, May 30, 1854; Warth, 130,343 and 130,344, Aug. 6, 1872 (cloth cutting), and English patent No. 2885, of 1856, in which are shafts which have both an endwise and rotary motion and correspond in shape to applicant's.

It is true that these shafts are not rub-rolls, but it is held that
194 they are so shaped and so revolved and moved endwise that their transfer to a carding machine, where they perform no new function, is not a patentable invention.

In order to render a combination of old devices patentable there must be some new result produced, and "the new result must be something more than the results which were separately produced complete before by the different parts of the combination." See Hailes *et al. vs.* Van Wormer *et al.*, 5th O. G., 89.

In the present case the rub-rolls only perform their old functions and nothing additional, and the angularly shaped shaft is substituted for the ordinary feathered shaft, and operates precisely as it does in the references, and the two together add nothing to the aggregate of their separate results.

This statement is again respectfully submitted.

WM. H. APPLETON, *Examiner.*

U. S. Patent Office, May 2, 1877.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the examiner's statement, dated January 27, 1882, in the matter of the reissue application of James Greaves, filed March 24, 1877, div. A, 2nd appeal, for condensing cylinder for carding engines.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed
195 this 17th day of October, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

[L. S.] E. M. MARBLE,
*Commissioner.*

In the United States Patent Office.

Before the honorable board of examiners-in-chief.

In the Matter of the Application of JAMES GREAVES, filed March 24, 1877, for reissue of letters patent No. 187,620, dated February 20, 1877, for condensing cylinders for carding engines.

(Div. A.)

*Statement of Grounds of the Examiner's Decision.*

The interference proceedings between the application and that of J. N. Stone for a patent for a similar invention having been determined by an award of priority of invention to the present applicant, this case has been returned by the Commissioner to the examiner, with instructions to consider the question as to whether the said applicant is entitled to the claim now set up by him in view of certain recent decisions of the U. S. Supreme Court, to wit: Giant Powder Co. *vs.* California Powder Works, 15 O. G., 289; Leggett *vs.* Avery, 17 O. G., 445; Swain Turbine and M'f'g Co. *vs.* Ladd, 19

O. G., 62, and Goodyear Dental Vulcanite Co. *vs.* Davis, 19 O. G., 543.

The claim in question is as follows:

"In a carding engine, a condensing or rubber cylinder mounted on a polygonally shaped horizontal shaft, in combination
196 with a driving gear, A, having a sleeve-shaped bearing, *b*, said shaft and cylinder being adapted to be revolved by the drive-wheel A, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described."

In accordance with the instructions above mentioned, the case has been taken up by the examiner and the claim in controversy duly considered in connection with the decisions referred to, and as a result thereof the examiner is convinced that the appellant is not entitled to the said claim, for the reasons, first, that it covers a different invention from that covered by the original patent; and, second, that he is estopped from setting up the same in a reissue at this time, he having deliberately withdrawn substantially the same claim from his original application after it had been rejected in order to obtain a patent on the other feature of the invention claimed.

The claim in controversy has accordingly been rejected by the examiner for these reasons, and from this rejection the present appeal is taken.

It is contended on the part of the appellant that the court cases named, upon which the examiner bases his decision, are not pertinent to the issues involved in this case, and that therefore his reissue application should be allowed.

In order to controvert these views of the applicant it is only necessary to briefly refer to the decisions named and to the file of the original Greaves application.

The first of the decisions noted in the order of their dates is the Giant Powder Co. *vs.* The California Co. In this case the original patent was granted for certain methods or processes of exploding nitro-glycerine. Subsequently a reissue of said patent was
197 taken, with claims, not for the methods or processes before set up, but for new mixtures of nitro-glycerine with gunpowder and various other substances; and this reissue was declared void as being for a different invention from that covered by the original patent. The gist of this decision is that a reissue must be for the same invention as is covered by the original patent, not only as regards the substance thereof; the patentee is not permitted by a reissue to add to or subtract from his invention as disclosed in his original patent whereby the character of the original invention may be changed.

The next decision noted is that of Leggett *vs.* Avery. This decision involves a case in which the inventor, in order to obtain an extension of his patent, filed a statutory disclaimer of several of his claims, and after receiving his extension reissued his said patent with the claims previously disclaimed restored therein, and sued thereon. The patent was declared void, the court holding that the

reissued patent covered a different invention from that covered by the extended patent. Incidental to the foregoing and in the construction of the reissue section of the statute the court expressed the greatest doubts as to whether "a reissued patent can be sustained in any case where it contains claims that have once been formally disclaimed by a patentee or rejected with his acquiescence, and he has consented to such rejection in order to obtain his patents," and stated that "under such circumstances the rejection of the claim can in no just sense be regarded as a matter of inadvertence or mistake," and that "even though it was such, the applicant would seem to be estopped from setting it up on an application for a reissue." This decision, while not going to the extent of saying in so many words that a reissued patent will be invalid which includes a claim that was rejected with the applicant's acqui-
198 escence, and the patent taken with such claim omitted, is usually relied upon by the office as authority for refusing to allow reissues which embrace claims of such character.

The next decision in order is that of Swain Turbine and Manufacturing Co. *vs.* Ladd. The doctrine here laid down is substantially the same as that enunciated in the case of The Giant Powder Co. *vs.* The California Powder Co., with, perhaps, the exception that its requirement that the reissue patent shall be for the same invention as that covered by the original patent is somewhat more stringent than those set forth therein, the law being laid down in this decision as follows:

"It was never intended to allow a patent to be enlarged, but to allow the correction of mistakes inadvertently committed and the restriction of claims which had been improperly made or which had been too broad, just the contrary of that which has come to be the practice. In a clear case of mistake—not error of judgment—the patent may undoubtedly be enlarged; but that should be the exception and not the rule."

The next and last decision to be noticed is that of The Goodyear Dental Vulcanite Co. *vs.* Davis. This decision is important in this connection only because of the fact that it contains a reaffirmation of the doubt expressed by the court in case of Leggett *vs.* Avery, *ante*, with reference to the legality of a reissue which contains a claim or claims which has or have been formally disclaimed by the patentee or rejected with his acquiescence, and he has consented to such rejection in order to obtain his original letters patent.

Thus we have a clear exposition or construction of the law bearing upon the questions involved in this appeal from the highest judicial tribunal in the land.

199 First, a reissue to be valid must be for the same invention as that covered by the original patent; second, the error corrected by the reissue must have arisen through inadvertence, accidental, or mistake; and, third, it is exceedingly doubtful whether a reissued patent can be sustained which includes a claim which had been formally disclaimed in the original patent or was rejected with the applicant's acquiescence, and the rejection thereof has been consented to by the applicant in order to obtain his patent. This is

the law, so far as it relates to the questions in hand, as construed by the Supreme Court. These facts being sufficient to defeat a reissue if granted, it must inevitably follow that if they be present when an application for reissue is pending before the office they must act as a bar to the allowance of the same.

Tested by the rules here laid down, what are the rights of the appellant in the present case?

Substantially the same claim as now sought by him was presented in the application upon which his original patent was granted (see substitute specification filed Nov. 19, 1876, paper No. 19 in the Greaves original file) and, after the same had been rejected by your honors, he acquiesced in and consented to its rejection by withdrawing the claim and taking a patent with the same omitted.

No inadvertence, accident, or mistake can be urged that caused the erasure of the said claim, as one similar thereto had already been contested in the office, first before the examiner, then before your honors, and finally before the Commissioner of Patents, who also rejected the same. It was to escape the patents already cited in the case that the claim was framed in the form that it was allowed.

The references were well known to the appellant, as will fully
200 appear from the disclaimer contained in the specification of the original patent and in the papers filed in the case, and the force and scope of the claim were fully understood by him.

As before stated, a claim similar to that now presented stood rejected by every tribunal in the office, and the case was closed before the same. Appellant's next step, if he considered himself entitled to the present claim, should have been an appeal to the courts. Such a course, however, he did not care to pursue; on the other hand, a motion was made before the Commissioner to reopen the case and return the same to the examiner with instructions to consider the same on an amended specification, in which the old invention was abandoned and new features appearing in the model were brought out and included in the claims.

The motion was granted. The construction and combination of parts previously claimed were made of secondary importance in the new presentation of the invention, and the metals of which the polygonally shaped shaft and the driving wheel or bearing thereof through which the said shaft reciprocated were formed were made to appear therein as the gist or essence of the invention, the appellant having discovered since the rejection of the previous claim by the Commissioner that his invention did not reside so much in the construction and combination of parts as it did in having the same constructed from certain materials. In other words, the appellant set forth his invention in the specification then submitted as consisting of the peculiar construction and combination of parts previously claimed by him, when the "polygonally shaped shaft" and the "driving gear" or wheel, or the bearings for the said shaft therethrough, were both made of cast iron or of metal having sub-
201 stantially the same crystalline structure. By the use of the devices previously claimed and the employment of the particular metals noted, it was urged that the beneficial results thereto-

fore supposed by him to be due to the peculiar construction and combination of parts made use of were obtained.

To the specification containing this new presentation of the invention, and upon which the original patent was allowed, were appended two claims, one of which, the first, covered simply the construction and combination of parts, substantially as previously claimed, without any reference therein to the materials employed in their manufacturing, and the other, the second, the same construction and combination of parts, with some minor change limited by the materials of which certain of the parts, as above mentioned, were made.

These two claims, being considered by the examiner substantially the same as those previously refused by him, were rejected upon the same references as were cited in the rejection of the earlier claims. The claims were then carried before your honors on appeal, the second being allowed and the first refused. Certain amendments were suggested by your honors to the first claim which, if adopted, would place the said claim in condition for allowance.

These amendments consisted in the insertion into said claim of the words "cast iron or metal of the same crystalline structure for bearing and spindle." (By bearing is meant in this connection the driving wheel or the bearing therein through which the said shaft reciprocates.) See your honor's decision of December 15, 1876, recorded vol. 15, page 4.

The amendments thus suggested were adopted by the appellant, and, after several other actions on the part of the office not necessary to notice herein, the case was passed for issue.

202 Simultaneous with the delivery of the original patent, reissue application was filed in two divisions.

Division A of this reissue is the matter now before us and contains the claim in controversy. The other, division B, is a substantial reproduction of the original patent, and by order of the Commissioner was passed for issue. It is now beyond the control of the office.

Such being the history of the claim in dispute, it is thought that the question above propounded can be easily answered if the requirements of the law, as explained by the decisions referred to herein, *is* kept in mind. In the first place, this claim, being for a combination of parts of peculiar construction, while the original is for a combination of parts when some of the same are constructed of particular metals, the metals being the gist of the claims thereof, is for a different invention from that covered by the original patent. In the second place, the claim now in controversy having been withdrawn from the application upon which the original patent was granted with a full knowledge of all the facts in the case, it cannot be urged that such withdrawal of the claim, or any other change that the appellant now desires to make, was the result of or necessitated by any inadvertence, accident, or mistake, for which alone corrections by reissue can be made. In this connection see James *vs.* Campbell *et al.*, 21 O. G., 337.

As a result, then, of these considerations it would appear that the appellant is not entitled to the claim now made.

It will, doubtless, be urged by the appellant that, in view of the fact that a reissue was asked before the original patent was sent from the office, he is entitled to the claim now sought under the recent decision of the Supreme Court of the United States in
203 the case of Miller *vs.* Bridgeport Brass Co., 21 G., 201; but it is not apparent how such decision can avail him anything, as the same, in having reference to the time within which a patentee should apply for a reissue, refers only to such cases as are properly reissuable, whereas in the present case there is no right of issue, the original file showing that no inadvertence, accident, or mistake was present when the claim now sought to be restored was withdrawn.

With these remarks, the case is respectfully submitted.

WM. H. APPLETON, *Examiner.*

U. S. Patent Office. Class, textiles. Jan'y 27, 1882.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from files of this office of the examiner's answer to reasons of appeal, dated November 13, 1879, in the matter of the reissue application of James Greaves, filed March 24, 1877, for condensing cylinders for carding engines.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this seventeenth day of October, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundred and seventh.

[L. S.] E. M. MARBLE,
*Commissioner.*

204 In the United States Patent Office.

Before the board of examiners-in-chief.

In the Matter of the Application of JAMES GREAVES, filed March 24, 1877, for reissue of letters patent No. 187,620, dated Feb'y 20, 1877, for condensing cylinders for carding engines.

(Div. A.)

*Examiner's Answer to Reasons of Appeal.*

The interference proceeding between the present application and that of J. M. Stone was suspended, at the examiner's request, for the purpose of citing a newly discovered reference.

Both of said interfering applications were rejected upon the same reference, and the present applicant, waiving a second rejection by the primary examiner, now appeals to your honors.

The invention in controversy relates to condensing carding engines in which a reciprocating endwise movement is imparted to the rub-rolls, and consists in forming the spindle or shaft of the condensing or rub roll square or polygonally in cross-section, and its bearing of corresponding shape, so as to reduce friction and wear.

The rejected claim is as follows:

"In a carding engine, a condensing or rubber cylinder mounted on a polygonally shaped horizontal shaft, in combination with a driving gear, A, having a sleeve-shaped bearing, *b*, said shaft and cylinder being adapted to be revolved by the drive-wheel A, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described."

205 The examiner cited English patent 1247, of 1863, in the rejection of this claim, which, while it fails to describe in words the peculiarities of the mechanism shown, illustrates it so fully that "those who run might read"—so fully that there cannot be the slightest doubt in regard to its substantial identity in construction and combination with the mechanism shown and claimed by the applicant. The reference drawing shows the rub-rolls arranged in sets (E *e*, F *f*, G *g*, and H *h*), in the usual manner, and each set has its upper and lower roll reciprocating longitudinally in the ordinary manner, so as to condense the roving as it passes through between them. The lower roll of each set is mounted in journal boxes upon the frame of the machine and driven by a gear, the journal of said roll being square in cross-section and fitting in the axial bearings, correspondingly square in cross-section, of the driving gears. The rub-rolls reciprocate with the square shafts, being securely attached thereto, and the driving gears are held stationary in their journal boxes against lateral movement while said reciprocation of the rolls is taking place. The reciprocating movements are imparted to the rub-rolls by means of the eccentrics W W and the connecting devices.

The foregoing mechanism in general is surely plainly illustrated in the drawing, and that it is substantially identical in construction and mode of operation with applicant's there should be no doubt; but the only point necessary for your honors to consider is whether or not the shaft is square or polygonal in form and adapted to move in a correspondingly shaped bearing; and upon this point there should be no doubt, since the square driving shafts, fitting in the square axial holes, are plainly shown in end view in Fig. 2 of the drawing by reference letters *m m*.

206 The plan view shown in Fig. 1 of said drawing also shows the shafts to be square at their ends, at least such must have been the intention of the draughtsman, since he makes a distinction in their representation from the shafts and portion of shafts which are round. They are shown without shading upon their top surfaces, while the round shafts are distinguished by heavy and light shading upon their upper surfaces. The examiner is of opinion that it would be a difficult undertaking to construct a drawing that would be more

expressive of the construction of the parts which it represents, that would speak more loudly or plainly of its metes and bounds.

The remaining question for your honors' consideration is whether or not a drawing unaccompanied by a written description, but clear and instructive, and convincing to your honors that it is exactly in point, is a sufficient bar to the grant of another patent for the same thing; whether or not a clearly illustrative drawing undescribed would not be as instructive to those skilled in the art as a written description, and whether a thing that is self-evident requires further proof. It is thought that your honors will have no doubt upon this question. Let us take an example to show the absurdity of any other ruling. In this class it is common to file applications for spools or bobbins, of peculiar shape, for holding on yarns or thread, and for spinning spindles of tapering form for reducing weight, etc. The examiner, as an expert or one skilled in the art, of course requires no further guide in his search than the mere forms of the spools or spindles shown in existing patents to enable him to determine the question of novelty; he has simply to become convinced through the eye that this shape and that are the same or not the same.

207 All the description that could be written would not be more convincing than the mere shapes of the things themselves, and so it would be with your honors if you were engaged in the primary examination of cases. Again, how common it is for the machinist to construct from mere drawings, without a word of description. They (the workmen upon this very building to-day are working from drawings, and they), from their knowledge of their calling, would consider it the height of uselessless to supplement them with descriptions.

The drawing in this reference does not represent a vague, indefinite, or complicated piece of mechanism. It is eminently clear and instructive, and those skilled in such machinery would find no difficulty in understanding it, as will appear from certain affidavits filed by the opposing applicant to sustain a motion to dissolve the interference in view of the present reference. (This being a contested case, it is thought that your honors would be justified in looking into the entire record.)

One of the statutory bars to the grant of a patent in this country is a prior patent or description of the same thing. The examiner holds that the reference cited is a prior patent, and that the drawing shown therein is just as much a part of the patent as the printed description; in other words, that the word "patented," in our law, includes all that goes to make up the patent, or both drawing and description, and that the drawing and description are integral parts of the whole, and consequently coextensive or coequal for purposes of anticipation when either or both are sufficient to disclose the invention. Our law recognizes and constitutes the drawing a part of the specifications or description. The description and illustration are mutually assisting, so that if one be deficient the other may relieve. How inconsistent, then, would it be to hold that one

208 part of a patent could be cited as a reference to the exclusion of another part, when both are equally pertinent or convincing.

It is the every-day practice of the office to cite drawings in anticipation, since the patentees, if they have not described or claimed the parts shown in such drawings, have the right to reissue and take up all that their drawings disclose. Then why should we adopt a different practice in regard to inventions shown on the drawings of foreign patents?

There appear to be no decisions rendered covering a question analogous even to that herein involved, that in Seymour *vs.* Osborne, 11 Wall., p. 516; that in Reeves *vs.* Keystone Bridge Co., 5 Fish., p. 456, and that of the Commissioner in T. B. Atterbury, p. 79, 1876, relating to insufficient description and illustration, unauthenticated plates, &c., and plates without date of publication.

The decision of Justice Clifford, however, in Cahill *vs.* Brown, p. 697, O. G., 15, is to the effect that a drawing alone is a sufficient reference. He says: "Inventions patented here cannot be superseded by the mere introduction of a foreign patent or publication, though of prior date, unless the description or drawings contain and exhibit a substantial representation of the patented improvement."

In reply to applicant's first reason for appeal, that the reference drawing fails to show or describe any part of a condensing carding engine, the examiner would state that he is in error.

The doffer C is part of the carding engine. Besides, applicant shows no part of a carding engine himself.

The examiner simply traverses his other specified reasons for appeal.

209 The case is respectfully submitted.

WM. H. APPLETON, *Examiner.*

U. S. Patent Office—class, textiles—Nov. 13, 1879.

212 UNITED STATES PATENT OFFICE.

JAMES GREAVES, of Philadelphia, Pennsylvania.

*Improvement in Condensing-Cylinders for Carding-Engines.*

Specification forming part of Letters Patent No. 187,620, dated February 20, 1877; application filed September 30, 1872.

To all whom it may concern:

Be it known that I, James Greaves, of Philadelphia, State of Pennsylvania, have invented certain new and useful improvements in condensing-cylinders for carding-engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

(Here follow diagrams marked pp. 210 & 211.)

Defendants Exhibit No. 1. 210

2 Sheets—Sheet 1.

J. GREAVES.

CONDENSING CYLINDERS FOR CARDING ENGINES.

No. 187,620. Patented Feb. 20, 1877.

FIG.3

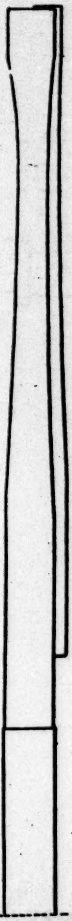
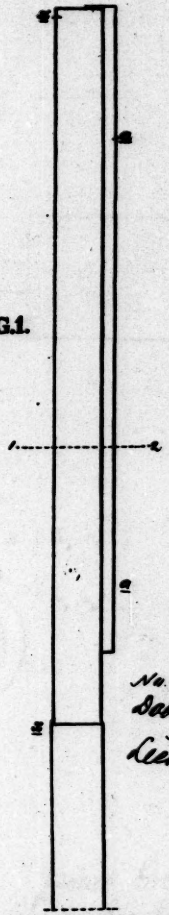


FIG.2.

FIG.1.




No. 331.
Dobson del. } p. 210.
Lee sc.

WITNESSES. Harry Smith
John K. Rupertus

James Greaves
by his Attys
Howson and Son

2 Sheets—Sheet 2.

J. GREAVES.

CONDENSING CYLINDERS FOR CARDING ENGINES.

No. 187,620. Patented Feb. 20, 1877.

No. 331.
Dobson et al.
v.
Lee et al.
} p. 211.

FIG. 4.

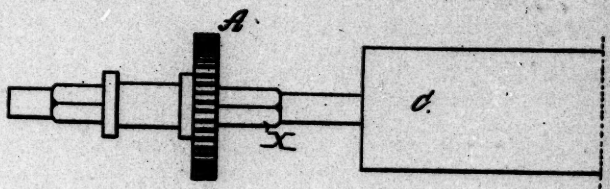
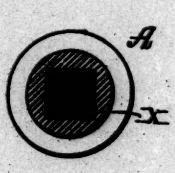



FIG. 5.




Witnesses, Harry Smith
Thomas W. Clarke

James Greaves
by his attorneys
Howson & Sons

My invention consists in the combination, in a carding-engine, of a condensing-cylinder, a driving-wheel, and a polygonally-shaped horizontal shaft or spindle, the latter being adapted to be revolved, and, at the same time, to be continuously reciprocated in a correspondingly polygonally-shaped bearing, and a continuously-reciprocating rubber, substantially as described; also, of the combination of a continuously-reciprocating rubber, a driving-wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast-iron, or both of metal having the same crystalline structure, whereby the crystalline particles of one will resist the wear which would otherwise be the tendency of the crystalline particles of the other.

This invention relates to condensing carding-engines which have a reciprocating motion imparted to the rubbers. Heretofore it has been the practice to make the bearing in which the shaft or spindle reciprocates of cast-iron and the shaft or spindle of steel, and the feather of the latter of steel or wrought-iron. This shaft or spindle is horizontal, and, in addition to the work it has to perform, it is required by its position to sustain its weight upon its sides, which alone tends to wear them. Then, again, the crystalline formation of the metal forming the bearing in which the spindle reciprocates has been found to bite or wear the steel away to such an extent as to require a new set of spindles every few months, a spindle under such circumstances rarely wearing over nine months, even with clean work. Some difference will, of course, result from the dirty or cleanly character of the work done by the carding-engine, but nine months is the average extreme limit of the use of this shaft or spindle. The wear of these shafts or spindles causes the reciprocating rubbers of the card to be untrue with respect to each other, thus occasioning the ruin of the work done by them and frequent breakage of that part of the apparatus.

The object of my invention is to overcome these difficulties and objections by making a more durable shaft or spindle, which I accomplish, in great measure, first, by making the spindle or shaft of such form as to distribute the wear occasioned by having to sustain its own weight, and the work it has to do, evenly over several parts of its sides or surface; second, by making this shaft or spindle of metal having the same hard crystalline structure as the bearing in which it reciprocates.

I have found, after four years' use, that my shafts or spindles so constructed have a smooth, glassy surface, are not perceptibly worn, and have faithfully and continuously worked during all that period.

On all kinds of work the adoption of my improved spindles has resulted in a saving of from twenty-five to fifty-four dollars per year upon each carding-engine to which they have been applied.

The old-fashioned feather is still employed by me when I use a spindle of the form shown in Fig. 1, and this results in the shaft or spindle being of cast-metal, and the feather of steel or iron. The latter two metals are of tougher or less brittle texture than

the former. Consequently, if the spindle should crack across, the feather would hold it together, as said feather is tightly wedged in its groove in the spindle.

The shaft or spindle of a condensing or rubbing cylinder for carding-engines consists, ordinarily, of a light bar, to which the cylinder of tinned plate is soldered or otherwise secured. This bar, being turned by a pinion at one end, turns the rubber at its other end, thus forming a horizontal connecting-shaft, commonly called a "spindle." The rubber has a rapid reciprocating motion at the same time that it is revolving rapidly upon its axis.

In the drawings, Figure 1, Sheet 1, represents one end of an ordinary spindle in its normal condition. Fig. 2 is a transverse section of the spindle on the line 1 2 of Fig. 1. Fig. 3 shows a
213 worn-out spindle; Fig. 4, Sheet 2, a side view of my polygonal shaft or spindle (square), showing also a part of the rubber and the pinion in which the shaft or spindle reciprocates; Fig. 5, a cross-section of the shaft or spindle in the bearing in which it reciprocates.

*a*, Fig. 1, is the feather; *x*, the body of the shaft or spindle. A, Fig. 4, is the pinion which turns the shaft or spindle X, and in the axis of which the latter reciprocates. C is the reciprocating rubber. The feather *a* is adapted to a groove in the hub of the driving-wheel or pinion, which wheel or pinion drives the shaft or spindle, as at A, Fig. 4, though in Fig. 4 a polygonal (square) shaft or spindle, X, is shown. The feather *a* is only requisite when the shaft or spindle is round.

Fig 3 shows a steel spindle worn out by the continuous friction of its cast-iron bearing—such wear as results from five to nine months' usage. The delay and trouble of removing these spindles is a source of much annoyance and expense, as the detaching of the tin cylinders, and securing them to new spindles, requires tedious manipulation. The old wrought-iron or steel spindle constantly required this attention.

I much prefer to make that part of the spindle which reciprocates upon or in its bearing of a polygonal shape in cross-section rather than to make it round and depend upon its feather to stand the wear occasioned by the revolving motion of its bearing, as by the former shape the wear is evenly distributed to the corners of the polygonal sides. When the shaft or spindle is square or polygonal its bearing, in which it reciprocates, must be of corresponding shape.

I am well aware that an upright square spindle has been used in spinning-frames, as in English patent No. 2885, for 1856; also that in cloth-cutting apparatus a triangular shaft extendable lengthwise in its bearings has been used. These I do not claim; but,

Having thus described my invention, what I desire to secure by letters patent is—

1. The combination, in a carding-engine, of a condensing or rubber cylinder, a driving-wheel, and a polygonally-shaped horizontal shaft or spindle, the latter being adapted to be revolved, and at the same time to be continuously reciprocated in a correspondingly polygonally-shaped bearing, said bearing and said shaft or spindle

Defendants Exhibit No. 3. 214

J. GREAVES,

Assignor of one-half to J. & J. Dobson.

# Condensing Cylinder for Carding Engines

No. 9,477. Reissued Nov. 23, 1880.

Fig. 1

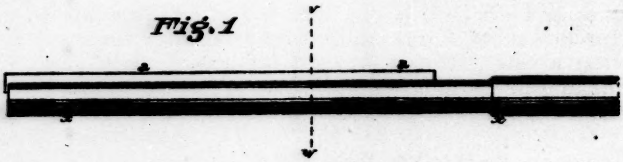


Fig. 2

Fig. 3

No. 331.
Dobson et al
v.
Leistal.
} p. 214.

Fig. 4

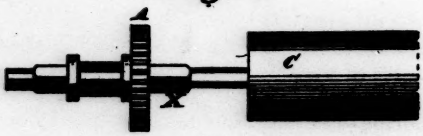



Fig. 5

Witnesses
Henry V. Buckley
Wm. H. Carson.

Inventor
James Greaves
by George E. Buckley
atty.

being of cast-iron or of metal of the same crystalline structure as cast-iron, and a continuously-reciprocating rubber, substantially as and for the purposes described.

2. In a carding-engine, the combination of a continuously-reciprocating rubber, a driving-wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast-iron, or both of metal having the same crystalline structure as cast-iron, whereby in the reciprocating action the tendency of the crystalline particles of cast-metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES GREAVES.

Witnesses:
WM. A. STEEL.
HUBERT HOWSON.

215 UNITED STATES PATENT OFFICE.

JAMES GREAVES, of Philadelphia, Pennsylvania, assignor of one-half to John Dobson and James Dobson, of same place.

*Condensing-Cylinder for Carding-Engines.*

Specification forming part of Reissued Letters Patent No. 9477, dated November 23, 1880; original No. 187,620, dated February 20, 1877; application for reissue filed March 15, 1877.

Division B.

To all whom it may concern:

Be it known that I, James Greaves, of Philadelphia, State of Pennsylvania, have invented certain new and useful improvements in condensing-cylinders for carding-engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

(Here follows diagram marked p. 214.)

My invention consists in the combination, in a carding-engine, of a condensing or rubber cylinder, a driving-wheel, and a polygonally-shaped horizontal shaft or spindle, the latter being adapted to be revolved, and at the same time to be continuously reciprocated in a correspondingly polygonally-shaped bearing, said bearing and said shaft or spindle being of cast-iron or of metal of the same crystalline structure as cast-iron, and a continuously-reciprocating rubber, substantially as and for the purposes hereinafter set forth; also, of the combination of a continuously-reciprocating rubber, a driving-wheel

to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast-iron, or both of metal having the same crystalline structure as cast-iron, whereby the crystalline particles of one will resist the wear of the crystalline particles of the other.

This invention relates to condensing carding-engines which have a reciprocating motion imparted to the rubbers. Heretofore it has been the practice to make the bearing in which the shaft or spindle reciprocates of cast-iron and the shaft or spindle of steel, and the feather of the latter of steel or wrought-iron. This shaft or spindle is horizontal, and, in addition to the work it has to perform, it is required by its position to sustain its weight upon its sides, which alone tends to wear them. Then, again, the crystalline formation of the metal forming the bearing in which the spindle reciprocates has been found to bite or wear the steel away to such an extent as to require every few months a new set of spindles, a spindle under such circumstances rarely wearing over nine months, even with clean work. Some difference will, of course, result from the dirty or cleanly character of the work done by the carding-engine, but nine months is the average extreme limit of the use of this shaft or spindle. The wear of these shafts or spindles causes the reciprocating rubbers of the card to be untrue with respect to each other, thus occasioning the ruin of the work done by them and frequent breakage of that part of the apparatus.

The object of my invention is to overcome these difficulties and objections by making a more durable shaft or spindle, which I accomplish, in great measure, first, by making the spindle or shaft of such form as to distribute the wear occasioned by having to sustain its own weight and the work it has to do evenly over several parts of its sides or surface; second, by making this shaft or spindle of metal having the same hard crystalline structure as the bearing in which it reciprocates.

I have found, after four years' use, that my shafts or spindles so constructed have a smooth, glassy surface, are not perceptibly worn, and have faithfully and continuously worked during all that period.

On all kinds of work the adoption of my improved spindles has resulted in a saving of from twenty-five to fifty-four dollars per year upon each carding-engine to which they have been applied.

The old-fashioned feather is still employed by me when I use a spindle of the form shown in Fig. 1, and this results in the shaft or spindle being of cast metal, and the feather of steel or iron. The latter two metals are of tougher or less brittle texture than the former. Consequently, if the spindle should crack across, the feather would hold it together, as said feather is tightly wedged in its groove in the spindle.

The shaft or spindle of a condensing or rubbing cylinder for carding-engines consists, ordinarily, of a light bar, to which the cylinder of tinned plate is soldered or otherwise secured. This bar, being

turned by a pinion at one end, turns the rubber at the other end,
216 thus forming a horizontal connecting-shaft, commonly called a "spindle." The rubber has a rapid reciprocating motion at the same time that it is revolving rapidly upon its axis.

In the drawings, figure 1 represents one end of an ordinary spindle in its normal condition. Fig. 2 is a cross-section on the line V W of Fig. 1. Fig. 3 shows a worn-out spindle. Fig. 4 is a side view of my polygonal shaft or spindle (square), showing also a part of the rubber and the pinion in which the shaft or spindle reciprocates; and Fig. 5, a cross-section of the shaft or spindle in the bearing in which it reciprocates.

*a*, Fig. 1, is the feather, and X the body of the shaft or spindle. A, Fig. 4, is the pinion which turns the shaft or spindle X, in center of which the latter reciprocates. C is the reciprocating rubber. The feather *a* is adapted to a groove in the hub of the driving-wheel or pinion, which wheel or pinion drives the shaft or spindle, as at A, Fig. 4, though in Fig. 4 a polygonal (square) shaft or spindle, X, is shown. The feather *a* is only requisite when the shaft or spindle is round.

Fig. 3 shows a steel spindle worn out by the continuous friction of its cast-iron bearing—such wear as results from five to nine months' usage. The delay and trouble of removing these spindles are a source of much annoyance and expense, as the detaching of the tin cylinders and securing them to new spindles require tedious manipulation. The old wrought-iron or steel spindle constantly required this attention.

I much prefer to make that part of the spindle which reciprocates upon or in its bearing of a polygonal shape or cross-section rather than to make it round and depend upon its feather to stand the wear occasioned by the revolving motion of its bearing, as by the former shape the wear is evenly distributed to the corners of the polygonal sides. When the shaft or spindle is square or polygonal its bearing, in which it reciprocates, must be of corresponding shape.

I am well aware that an upright square spindle has been used in spinning-frames, as in English patent No. 2885, for 1856; also that in cloth-cutting apparatus a triangular shaft extendible lengthwise in its bearings has been used. These I do not claim; but,

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The combination, in a carding-engine, of a condensing or rubber cylinder, a driving-wheel, and a polygonally-shaped horizontal shaft or spindle, the latter being adapted to be revolved, and at the same time to be continuously reciprocated in a correspondingly polygonally-shaped bearing, said bearing and said shaft or spindle being of cast-iron or of metal of the same crystalline structure as cast-iron, and a continuously reciprocating rubber, substantially as and for the purposes described.

2. In a carding engine, the combination of a continuously-reciprocating rubber, a driving-wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made

of cast-iron, or both of metal having the same crystalline structure as cast-iron, whereby in the reciprocating action the tendency of the crystalline particles of cast metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter, substantially as and for the purposes described.

JAMES GREAVES.

Witnesses:
ALBERT E. ZACHERLE.
GEORGE H. SONNEBORN.

218 UNITED STATES PATENT OFFICE.

JAMES GREAVES, of Philadelphia, Pennsylvania, assignor of one-half to John Dobson and James Dobson, of same place.

*Condensing-Cylinder for Carding-Engines.*

Specification forming part of Reissued Letters Patent No. 10054, dated March 7, 1882; original No. 187,620, dated February 20, 1877; application for reissue filed March 24, 1877.

Division A.

To all whom it may concern:

Be it known that I, James Greaves, of Philadelphia, State of Pennsylvania, have made certain new and useful improvements in condensing-cylinders for carding-engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

(Here follows diagram marked p. 217.)

The nature of my invention is as follows, viz:

My invention consists, in a carding-engine, of a condensing or rubber cylinder mounted upon a polygonally-shaped horizontal shaft, in combination with a driving-gear having a sleeve-shaped bearing, said shaft or cylinder being adapted to be revolved by the said driving-gear, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes hereinafter set forth.

This invention relates to condensing carding-engines which have a reciprocating motion imparted to the rubbers. The shaft or spindle is horizontal, and in addition to the work it has to perform it is required by its position to sustain its own weight upon its sides, which alone tends to wear them. Some difference will of course result from the dirty or cleanly character of the work done by the carding-engine, but nine months is the average extreme limit of the use of ordinary round feathered spindles. The wear of these shafts or spindles causes the reciprocating rubbers of the card to be untrue with respect to each other, thus occasioning the ruin of the work done by them and frequent breakage of that part of the apparatus.

The object of my invention is to overcome these difficulties and objections by making a more durable shaft or spindle, which I accomplish by making the spindle or shaft of such polygonal form,

J. GREAVES,

Assignor of one-half to J. & J. Dyson.

CONDENSING CYLINDER FOR CARDING ENGINES.

No. 10,054. Reissued Mar. 7, 1882

Fig. I.

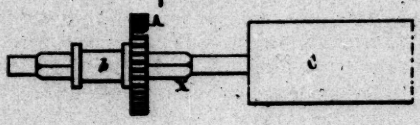



Fig. II

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v.
Allen et al
p. 217

Witnesses

Albert E. Zachrisson
George H. Sonneborn

Inventor

James Greaves
per George E. Breaker
Atty.

dispensing with a feather, as to distribute the wear occasioned by having to sustain its own weight and the work it has to do evenly over several parts of its sides or surface. I have found after several years' use that my shafts or spindles so constructed are very little worn, and have faithfully and continuously worked during all that period.

On all kinds of work the adoption of my improved spindles has resulted in a saving of from twenty-five to fifty-four dollars per year upon each carding-engine to which they have been applied.

The shaft or spindle of a condensing or rubbing cylinder for carding-engines consists ordinarily of a light shaft or bar, to which the cylinder of tinned plate is soldered or otherwise secured. This bar, being turned by a pinion at one end, turns the rubber at its other end, thus forming a horizontal connecting-shaft, commonly called a "spindle." The rubber has a rapid reciprocating motion at the same time that it is revolving rapidly upon its axis.

In the drawings, figure 1 shows a side view of my polygonal shaft or spindle, (square,) showing also a part of the rubber and the pinion in which the shaft or spindle reciprocates. Fig. 2 is a cross-section of the shaft or spindle in the bearing in which it reciprocates.

A is the pinion which turns the shaft or spindle X, and in the center *b* of which the latter reciprocates. C is the reciprocating rubber. The square shaft X is adapted to a square hole in the hub of the driving-wheel or pinion A, which wheel or pinion drives the shaft or spindle. The delay and trouble of removing the shafts or spindles when worn out are a source of much annoyance and expense, as the detaching of the tin cylinders and securing them to new spindles require tedious manipulation. I make that part of the spindle which reciprocates upon or in its bearing of a polygonal shape in cross-section rather than to make it round, as by the former shape the wear is evenly distributed to the corners of the polygonal sides. When the shaft or spindle is square or polygonal, its bearing, in which it reciprocates, must of course be of corresponding shape.

I am well aware that an upright square spindle has been
219 used in spinning-frames, as in English patent No. 2885, of 1856; also, that in cloth-cutting apparatus a triangular shaft, extendible lengthwise in its bearings, has been used. These I do not claim; but,

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

In a carding-engine, a condensing or rubber cylinder mounted on a polygonally-shaped horizontal shaft, in combination with a driving-gear, A, having a sleeve-shaped bearing, *b*, said shaft and cylinder being adapted to be revolved by the drive-wheel A, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described.

JAMES GREAVES.

Witnesses:
ALBERT E. ZACHERLE.
GEORGE H. SONNEBORN.

221 UNITED STATES PATENT OFFICE.

JAMES GREAVES, of Philadelphia, Pennsylvania.

*Improvement in Rolls for Carding-Machines.*

Specification forming part of Letters Patent No. 152,628, dated June 30, 1874; application filed April 13, 1874.

To all whom it may concern:

Be it known that I, James Greaves, of the city of Philadelphia, Pennsylvania, have invented an improvement in card rollers and spindles, of which the following is a specification:

The object of my invention is to prevent the rapid wearing away of the spindles of card-rollers, by causing the roller A to reciprocate on, and rotate with, a spindle, B, arranged to revolve with the driving-wheel in fixed bearings, as shown in the longitudinal section, figure 1, and transverse section, Fig. 2, of the accompanying drawing.

(Here follows diagram marked p. 220.)

It has been the usual practice to secure the spindle of a card-roller directly to the latter, and to cause it to reciprocate in, and rotate with, a driving-wheel arranged to revolve in fixed bearings, the spindle being round, and furnished with a key or feather, adapted to a groove in the eye of the wheel. These reciprocating and rotating spindles wear away rapidly, and the necessity of renewing them from time to time is a source of delay and expense, which my invention is intended to obviate.

The card-roller A, one end only of which is shown in the drawing, is, as usual, made of tinned plate, and has a center-piece, D, which is secured to the roller through the medium of annular plates *a* and *a'*, or in any other suitable manner, a square central opening, *b*, extending entirely through the center-piece, for the reception of the square spindle B, which is secured to, or forms a part of, the driving-wheel, the journal *e* of the latter being arranged to revolve in the usual fixed bearings on the frame of the engine. A horizontal reciprocating motion is imparted to the card-roller A in the usual manner; and the desired rotary motion is transmitted to it through the wheel E and its spindle B.

By this arrangement an opportunity is afforded for making such a long bearing for the spindle that the wearing away of the same must be a very slow process, for the center-piece D, which forms this bearing, can be extended within the roller to any desired distance. The length of bearing shown in the drawing will, however, suffice.

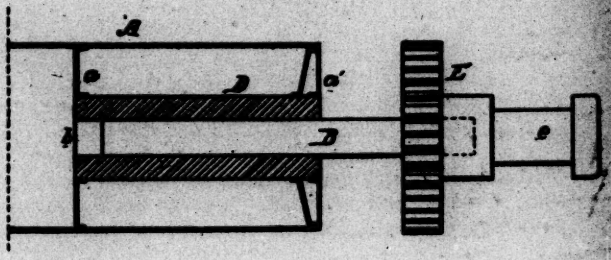
The bearing for the square spindle may be effectually lubricated by introducing oil through a suitable opening in the end of the roller, and permitting the oil to pass through holes in the center-piece.

J. GREAVES.

Rolls for Carding-Machines.

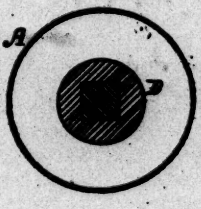
No. 152,628. Patented June 30, 18

FIG. 1.




No. 33.
Dobson et al. } A. 220.
N.
Lees et al.

FIG. 2.




Witnesses, Harry Smith.
Thomas M. Ilsam

James Greaves
by his Attys
Howson and

The said center-piece may, if desired, be made of steel or brass; but I have found that it may be made to advantage of ordinary cast-iron.

Whenever it becomes necessary to renew the center-piece, it can be readily detached from the roller to make way for a new one. In like manner the square spindle B may be so connected to the wheel that it can be readily detached therefrom; but such renewals will only be required at very long intervals.

Although I have alluded to the spindle B as being square, and adapted to a square hole in the center-piece, the spindle may be of a triangular or other shape, which will insure the turning of the roller with the spindle, the opening in the center-piece being of a form to correspond with that of the spindle.

I claim as my invention—

The tin roller A and its removable center-piece or bearing D, combined with the spindle B and wheel E, the roller reciprocating on the shaft, and all being constructed and combined as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES GREAVES.

Witnesses:
WM. A. STEEL.
HUBERT HOWSON.

222 And afterwards, to wit, on the 19th day of April, A. D. 1887, come the parties aforesaid; and this cause being called for argument on pleadings and proofs, and having been argued by counsel for the respective parties, and the court, not being fully advised in the premises, take the same under consideration.

And afterwards, to wit, on the 25th day of April, A. D. 1887, the court file the following opinion, to wit:

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit.

DOBSON *et al.* *vs.* LEES. } In Equity. No. 59. April Sess., 1882.

223 *Per Curiam:*

In the view we take of this case the only question it is necessary to consider is that which involves the validity of the reissue upon which the suit is founded.

The reissue is assailed on two grounds:

1st. That it is an expansion of the original patent, the sole claim in it not being covered by the original; and,

2nd. That it was not competent for the Commissioner of Patents to grant a reissue with this effect and for this purpose.

We find the first ground of objection to be fully sustained by a comparison of the original and reissued patents.

The only claim in the reissue is for a combination not claimed in or covered by the original patent, and hence is not for the same invention described or claimed in the latter.

Can this defect be corrected by a reissue? The claim in
224 the reissue was before the Commissioner and its allowance urged by the patentee through his solicitor, but was not allowed, being omitted at his instance; and it was thereupon stricken out by the solicitor. The patent was issued without this claim and was accepted in this form, but a week or two after its issue was surrendered by the patentee and a reissue asked for, which was ultimately granted in its present form.

Under these circumstances we regard this case as falling clearly within the case of Leggett *vs.* Avery, 101 U. S., page 256. Mr. Justice Bradley there says:

"It is obvious on inspection that these claims are for substantially the same inventions which were disclaimed before the extension, and are for different inventions from that which was included in and secured by the letters patent as extended. The court
225 below deemed this, amongst other things, a fatal objection to the validity of the reissued letters patent. We agree with the circuit court. We think it was a manifest error of the Commissioner in the reissue to allow to the patentee a claim for an invention different from that which was described in the surrendered letters and which he had thus expressly disclaimed. The pretence that an 'error had arisen by inadvertence, accident, or mistake' within the meaning of the patent law was too bald for consideration. The very question of the validity of these claims had just been considered and decided with the acquiescence and the express disclaimer of the patentee. If in any case where an applicant for letters patent in order to obtain the issue thereof disclaims a particular invention or acquiesces in the rejection of a claim thereto a reissue containing such claim is valid (which we greatly doubt), it certainly cannot be sustained in this case. The allowance of
226 claims once formally abandoned by the applicant in order to get his letters patent through is the occasion of immense frauds against the public. It not unfrequently happens that after an application has been carefully examined and compared with previous inventions, and after the claims which such an examination renders admissible have been settled with the acquiescence of the applicant, he or his assignee, when the investigation is forgotten and perhaps new officers have been appointed, comes back to the Patent Office and, under the pretence of inadvertence and mistake in the first specification, gets inserted into reissued letters all that had been previously rejected. In this manner, without an appeal, he gets the first decision of the office reversed, steals a march on the public and on those who before opposed his pretensions (if, indeed, the latter have not been silenced by purchase), and procures a valuable monopoly to which he has not the slightest title. We have more
227 than once expressed our disapprobation of this practice. As before remarked, we consider it extremely doubtful whether reissued letters can be sustained in any case where they contain

claims that have once been formally disclaimed by the patentee or rejected with his acquiescence and he has consented to such rejection in order to obtain his letters patent. Under such circumstances the rejection of the claim can in no just sense be regarded as a matter of inadvertence or mistake. Even though it was such, the applicant should seem to be estopped from setting it up on an application for a reissue."

This case has been followed repeatedly. See Shepard *vs.* Carrigan, 116 U. S., 593; Cartridge Company *vs.* Cartridge Company, 112 U. S., 624; Atwater Company *vs.* Beecher Company, 8 Fed. Rep., 608; Putnam *vs.* Hutchinson, 12 *id.*, 487; Edgartin *vs.* Man. Company, 9 *id.*, 450; Street *vs.* Lawton, 11 *id.*, 309.

228 We cannot distinguish the patentee and his counsel as to what occurred during the pendency of the application for the patent and the acceptance of it by the latter, *or* was earnestly urged in the argument. We must regard the patentee as bound by the acts of his counsel and give effect to them accordingly.

The bill is therefore dismissed at the costs of the complainant-.

(Endorsed:) No. 59, April sess., 1882. C. C. U. S., E. D. of Pa. Dobson *vs.* Lees. Opinion. Filed April 25, 1887.

229 And afterwards, to wit, on the 6th day of May, A. D. 1887, the court enters the following decree, viz.:

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania. In Equity.

DOBSON *et al.* *vs.* LEES *et al.* } April Sess., 1882. No. 59.

And now, May 6, 1887, this cause having come on to be heard at this term of the court upon the pleadings and proofs, and the same having been argued by counsel for the parties respectively and duly considered by the court, it is now hereby ordered, adjudged, and decreed that the bill of complaint be dismissed with costs to the defendants, to be taxed by the clerk *sec reg.*

230 (Endorsed:) 59, Ap'l sess., 1882. U. S. cir. c't. Equity. Dobson *vs.* Lees. Final decree. Filed 6 May, 1887.

231 And afterwards, to wit, on the 6th day of May, A. D. 1887, the complainants, by their solicitors, come into court here and prays an appeal to the Supreme Court of the United States, and the same is allowed in the words following, viz:

JOHN DOBSON and JAMES DOBSON, Trading as J. and J. Dobson, *vs.* JAMES LEES, JOSEPH LEES, and JOHN S. LEES, Trading as James Lees and Sons. } In Equity.

This day came the complainants herein, by their solicitors, and

in open court prayed an appeal from the order and decree entered herein on the 6th day of May, 1887, "dismissing the bill of complaint," which said prayer is hereby allowed and granted, and the appeal bond fixed at the sum of one thousand dollars.

232 (Endorsed:) No. 59, April session, 1882. United States circuit court, eastern district of Pennsylvania. In equity. John Dobson and James Dobson, trading as J. and J. Dobson, *vs.* James Lees, Joseph Lees, and John S. Lees, trading as James Lees and Sons. Appeal. Filed 6 May, 1887.

233 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania.

JOHN DOBSON and JAMES DOBSON, Trading as J. and J. Dobson, Complainants and Appellants,
*vs.*
JAMES LEES, JOSEPH LEES, and JOHN S. LEES, Trading as James Lees and Sons, Defendants and Appellees.

Know all men by these presents that we, John Dobson and James Dobson, trading as J. and J. Dobson, are held and firmly bound unto the above-named James Lees, Joseph Lees, and John S. Lees, trading as James Lees and Sons, in the sum of one thousand dollars, to be paid to the said James Lees, Joseph Lees, and John S. Lees, trading as James Lees and Sons, or their heirs, executors, or administrators; to which payment, well and truly to be made,
234 we bind ourselves and each of us, jointly and severally, and our and each of our heirs, executors, and administrators, firmly by these presents.

Sealed with our seals and dated this sixth day of May, A. D. one thousand eight hundred and eighty-seven.

Whereas the above-named John Dobson and James Dobson, trading as J. and J. Dobson, *has* appealed to the Supreme Court of the United States to reverse the final decree rendered in the above-entitled cause on the sixth day of May, 1887:

Now, therefore, the condition of this obligation is such that if the above-named John Dobson and James Dobson, trading as J. and J. Dobson, shall prosecute their said appeal to effect and answer all costs if they shall fail to make good their said appeal, then this obligation shall be void; otherwise the same shall be and remain in full force and virtue.

JOHN DOBSON. [SEAL.]
JAMES DOBSON. [SEAL.]

235 The above and foregoing bond is entirely satisfactory to me without oath and without security.

H. T. FENTON,
*Solicitor for Defendants.*

(Endorsed:) No. 59, April session, 1882. United States circuit court, eastern district of Pennsylvania. In equity. John Dobson

and James Dobson, trading as J. and J. Dobson, complainants and appellants, *vs.* James Lees, Joseph Lees, and John S. Lees, trading as James Lees and Sons, defendants and appellees. Appeal bond. Filed May 6, 1887.

236 THE UNITED STATES OF AMERICA, *ss:*

To James Lees, Joseph Lees, and John S. Lees, trading as James Lees & Sons, Greeting:

Whereas John Dobson and James Dobson, trading as J. & J. Dobson, have lately appealed to the Supreme Court of the United States from a decree lately rendered in the circuit court of the United States for the eastern district of Pennsylvania, made in favor of you, the said James Lees, Joseph Lees, and John S. Lees, trading as James Lees & Sons as aforesaid, and have filed the security required by law, you are, therefore, hereby cited to appear before the said Supreme Court, at the city of Washington, on the second Monday of October next, to do and receive what may appertain to justice to be done in the premises.

Given under my hand, at the city of Philadelphia, in the third circuit, this 6 day of May, in the year of our Lord one thousand eight hundred and eighty-seven.

WM. BUTLER,
*U. S. District Judge, E. D. Pa., Sitting and Holding Circuit Court, there Being no Circuit Judge or Associate Justice in said District.*

I hereby accept service of above citation on behalf of appellees, defendants below.

H. T. FENTON.

May 6, '87.

237 [Endorsed:] No. 59, April session, 1882. United States circuit court, eastern district of Pennsylvania. In equity. John Dobson and James Dobson, trading as J. & J. Dobson, *vs.* James Lees, Joseph Lees, and John S. Lees, trading as James Lees & Sons. Citation. Returned service accepted May 6, 1887.

238 Circuit Court of the United States, Eastern District of Pennsylvania.

DOBSON *et al.* *vs.* LEES. } In Equity. No. 59. April Session, 1882.

On appeal to the Supreme Court of the United States.

It is hereby stipulated and agreed by and between counsel in the above case that the attached transcript contains all papers and documents deemed by either party material or necessary, and that

the same shall be and constitute the transcript of record for use in the Supreme Court of the United States.

May 27, '87.

H. T. FENTON,
*Sol'r for Lees et al., Appellees.*
FRANCIS T. CHAMBERS,
*Solicitor for Dobson et al., Appellants.*

[Endorsed:] Dobson *vs.* Lees.

239 UNITED STATES OF AMERICA, *Eastern District of Pennsylvania,* } *sct:*

I, Samuel Bell, clerk of the circuit court of the United States of America for the eastern district of Pennsylvania, in the third circuit, do hereby certify the foregoing to be a true and faithful copy of the original pleas and proceedings in the case of John Dobson *et al. vs.* James Lees *et al.*, No. 59, April session, 1882, on file and now remaining among the records of the said court in my office.

In testimony whereof I have hereunto subscribed my name and affixed the seal of the said court, at Philadelphia, this second day of June, in the year of our Lord one thousand eight hundred and eighty-seven, and of the Independence of the United States the one hundred and eleventh.

Seal U. S. Circuit Court, E. D. Pennsylvania.

SAMUEL BELL,
*Clerk of C. C.*

[Endorsed:] No. —, —— sessions, 188–. Circuit court United States, eastern district of Pennsylvania. Certified copy.

Endorsed on cover: E. Pennsylvania C. C. U. S. No. 331. John Dobson and James Dobson, trading as John and James Dobson, appellants, *vs.* James Lees, Joseph Lees, and John Lees, trading as James Lees & Sons. Filed June 10, 1887.

No. 527.

Supreme Court of [illegible]

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Delaney et al

vs.

Lees et al

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BRIEF FOR APPELLANTS

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FRANCIS T. [illegible]

Counsel [illegible]

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Argus Law & Court Printing Co.

SUPREME COURT OF THE UNITED STATES.

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*John Dobson* et al.

vs.

*James Lees* et al.

October Term, 1889.

No. 331.

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## *BRIEF FOR APPELLANTS.*

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## STATEMENT OF THE CASE.

This is a suit in equity brought by the appellants (the plaintiffs below) for the infringement of the re-issued letters patent No. 10,054, granted to James Greaves and his assignees, March 7th, 1882, for an improvement in condensing-cylinders for carding-engines. The original patent was dated February 20th, 1877, and numbered 187,620, and the application for the re-issue was filed March 24th, 1877.

Infringement is admitted by the appellees (defendants below). (Record, pages 10 and 11.)

The defenses set up in the answer and not expressly waived are as follows:—

(*a.*) That the re-issue is void because it claims an invention different from that described and claimed in the original patent, and because new matter was interpolated into the re-issue, embracing changes and alterations which were in use as public property, and which devices had, during the prosecution of the original application, been disclaimed by the patentee on the requirement of the Commissioner of Patents.

(*b.*) That the re-issue is void because on the surrender of the original patent two divisional re-issued applications were filed, one of which issued prior to the patent in suit.

(*c.*) That the re-issue is void because the invention claimed therein was abandoned, having been in public use for more than two years before the application for the original letters patent was filed.

(*d.*) That the re-issue is void because the device claimed therein was not one which involved invention or patentable novelty.

(*e.*) That the re-issue was void because the invention claimed therein had been published in certain letters patent, and known to divers persons, all set out in the answer.

A replication was filed to the answer, proofs taken by the parties, and the case brought to final hearing, and decided by the court below, which dismissed the bill of complaint, holding that the patent was void because the claim of the re-issue covered a device not covered by the original patent, and which claim having been originally made in and stricken from the original application, it was not competent to resume by re-issue. (Opinion, pages 123–5.)

From the decree dismissing the bill the complainants appealed to this court.

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## ASSIGNMENTS OF ERROR.

We submit that the learned court below erred :—

### I.

In holding that the claim of the re-issue No. 10,054 is for an invention not described or claimed in the original patent; whereas the learned court should have found that although not specifically and technically covered by the claims following the specification in the original patent, yet the specification of said patent does describe as the invention of the patentee the identical combination covered by the re-issue.

II.

In holding that the patentee was finally concluded and estopped by the action of his solicitor in striking from the original application a claim similar to that of the re-issue, notwithstanding that said solicitor's action was taken without the patentee's knowledge or authority, and notwithstanding that on being informed of said action, the patentee at once repudiated it, and filed his application for a re-issue within a week or two of the issue of the original patent; whereas the learned court should have found that the unauthorized erasure of the claim having been at once repudiated by the patentee, he was not estopped by the action of his attorney, and especially so as the specification of the original patent, as issued, laid ground for the claim and notified the public that it was the patentee's invention.

III.

In dismissing the bill of complaint.

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## ARGUMENT.

### The Re-issue.

The original patent No. 187,620, of February 20th, 1877, is printed pages 114 to 117 of the record, and the re-issue is printed on pages 120 and 121.

James Greaves, of Philadelphia, Pennsylvania.

*Improvement in Condensing-Cylinders for Carding-Engines.*

Specification forming part of letters patent No. 187,620, dated February 20th, 1877; application filed September 30th, 1872.

United States Patent Office.

James Greaves, of Philadelphia, Pennsylvania, assignor of one-half to John Dobson and James Dobson, of same place.

*Condensing-Cylinder for Carding-Engines.*

Specification forming part of re-issued letters patent No. 10,054, dated March 7th, 1882; original No. 187,620, dated February 20th, 1877; application for re-issue filed March 24th, 1877.

To all whom it may concern:

Be it known that I, James Greaves, of Philadelphia, State of Pennsylvania, have invented certain new and useful improvements in condensing-cylinders for carding-engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

My invention consists in the combination, in a carding-engine, of a condensing-cylinder, a driving-wheel, and a polygonally-shaped horizontal shaft or spindle, the latter being adapted to be revolved, and, at the same time, to be continuously reciprocated in a correspondingly polygonally-shaped bearing, and a continuously-reciprocating rubber, substantially as described; also, of the combination of a continuously-reciprocating rubber, a driving-wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast iron, or both of metal having the same crystalline structure, whereby the crystalline particles of one will resist the wear which would otherwise be the tendency of the crystalline particles of the other.

This invention relates to condensing carding-engines which have a reciprocating motion imparted to the rubbers.

Heretofore it has been the practice to make the bearing in which the shaft or spindle reciprocates of cast iron and the shaft or spindle of steel, and the feather of the latter of steel or wrought iron.

This shaft or spindle is horizontal, and, in addition to the work it has to perform, it is required by its position to sustain its weight upon its sides, which alone tends to wear them.

Then, again, the crystalline formation of the metal forming the bearing in which the spindle reciprocates has been found to bite or wear the steel away to such an extent as to require a new set of spindles every few months, a spindle under such circumstances rarely wearing over nine months, even with clean work.

Some difference will, of course, result from the dirty or cleanly character of the work done by the carding-engine, but nine months is the average extreme limit of the use of this shaft

Division A.

To all whom it may concern:

Be it known that I, James Greaves, of Philadelphia, State of Pennsylvania, have made certain new and useful improvements in condensing-cylinders for carding-engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

The nature of my invention is as follows, viz.:—

My invention consists, in a carding-engine, of a condensing or rubber cylinder mounted upon a polygonally-shaped horizontal shaft, in combination with a driving-gear having a sleeve-shaped bearing, said shaft or cylinder being adapted to be revolved by the said driving-gear, and at the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes hereinafter set forth.

This invention relates to condensing carding-engines which have a reciprocating motion imparted to the rubbers.

The shaft or spindle is horizontal, and in addition to the work it has to perform it is required by its position to sustain its own weight upon its sides, which alone tends to wear them.

Some difference will, of course, result from the dirty or cleanly character of the work done by the carding-engine, but nine months is the average extreme limit of the use of ordinary

or spindle. The wear of these shafts or spindles causes the reciprocating rubbers of the card to be untrue with respect to each other, thus occasioning the ruin of the work done by them and frequent breakage of that part of the apparatus.

The object of my invention is to overcome these difficulties and objections by making a more durable shaft or spindle, which I accomplish, in great measure, first, by making the spindle or shaft of such form as to distribute the wear occasioned by having to sustain its own weight, and the work it has to do, evenly over several parts of its sides or surface.

Second, by making this shaft or spindle of metal having the same hard crystalline structure as the bearing in which it reciprocates.

I have found, after four years' use, that my shafts or spindles so constructed have a smooth, glassy surface, are not perceptibly worn, and have faithfully and continuously worked during all that period.

On all kinds of work the adoption of my improved spindles has resulted in a saving of from twenty-five to fifty-four dollars per year upon each carding-engine to which they have been applied.

The old-fashioned feather is still employed by me when I use a spindle of the form shown in Fig. 1, and this results in the shaft or spindle being of cast metal, and the feather of steel or iron. The latter two metals are of tougher or less brittle texture than the former. Consequently, if the spindle should crack across, the feather would hold it together, as said feather is tightly wedged in its groove in the spindle.

The shaft or spindle of a condensing or rubbing cylinder for carding-engines consists, ordinarily, of a light bar, to which the cylinder of tinned plate is soldered or otherwise secured. This bar, being turned by a pinion at one end, turns the rubber at its other end, thus forming a horizontal connecting-shaft, commonly called a "spindle." The rubber has a rapid reciprocating motion at the same time that it is revolving rapidly upon its axis.

In the drawings, Fig. 1, Sheet 1, represents one end of an ordinary spindle in its normal condition. Fig. 2 is a transverse section of the spindle on the line 1 2 of Fig. 1. Fig. 3 shows a worn-out spindle.

round-feathered spindles. The wear of these shafts or spindles causes the reciprocating rubbers of the card to be untrue with respect to each other, thus occasioning the ruin of the work done by them and frequent breakage of that part of the apparatus.

The object of my invention is to overcome these difficulties and objections by making a more durable shaft or spindle, which I accomplish by making the spindle or shaft of such polygonal form, dispensing with a feather, as to distribute the wear occasioned by having to sustain its own weight and the work it it has to do evenly over several parts of its sides or surface.

I have found after several years' use that my shafts or spindles so constructed are very little worn, and have faithfully and continuously worked during all that period.

On all kinds of work the adoption of my improved spindles has resulted in a saving of from twenty-five to fifty-four dollars per year upon each carding-engine to which they have been applied.

The shaft or spindle of a condensing or rubbing cylinder for carding-engines consists ordinarily of a light shaft or bar, to which the cylinder of tinned plate is soldered or otherwise secured. This bar, being turned by a pinion at one end, turns the rubber at its other end, thus forming a horizontal connecting-shaft, commonly called a "spindle." The rubber has a rapid reciprocating motion at the same time that it is revolving rapidly upon its axis.

Fig. 4, Sheet 2, a side view of my polygonal shaft or spindle (square), showing also a part of the rubber and the pinion in which the shaft or spindle reciprocates; Fig. 5, a cross-section of the shaft or spindle in the bearing in which it reciprocates.

*a*, Fig. 1, is the feather; *x*, the body of the shaft or spindle. A, Fig. 4, is the pinion which turns the shaft or spindle X, and in the axis of which the latter reciprocates. C is the reciprocating rubber. The feather *a* is adapted to a groove in the hub of the driving wheel or pinion, which wheel or pinion drives the shaft or spindle, as at A, Fig. 4, though in Fig. 4 a polygonal (square) shaft or spindle, X, is shown. The feather *a* is only requisite when the shaft or spindle is round.

Fig. 3 shows a steel spindle worn out by the continuous friction of its cast-iron bearing—such wear as results from five to nine months' usage.

The delay and trouble of removing these spindles is a source of much annoyance and expense, as the detaching of the tin cylinders, and securing them to new spindles, requires tedious manipulation. The old wrought-iron or steel spindle constantly required this attention.

I much prefer to make that part of the spindle which reciprocates upon or in its bearing of a polygonal shape in cross-section rather than to make it round and depend upon its feather to stand the wear occasioned by the revolving motion of its bearing, as by the former shape the wear is evenly distributed to the corners of the polygonal sides. When the shaft or spindle is square or polygonal its bearing, in which it reciprocates, must be of corresponding shape.

I am well aware that an upright square spindle has been used in spinning-frames, as in English patent No. 2885, for 1856; also that in cloth-cutting apparatus a triangular shaft extendable lengthwise in its bearings has been used. These I do not claim; but,

Having thus described my invention, what I desire to secure by letters patent is—

1. The combination, in a carding-engine, of a condensing or rubber cylinder, a driving-wheel, and a polygonally-shaped horizontal shaft or spindle, the latter being adapted to be revolved, and at the same time to be continuously reciprocated in a correspond-

In the drawings, Fig. 1 shows a side view of my polygonal shaft or spindle (square), showing also a part of the rubber and the pinion in which the shaft or spindle reciprocates. Fig. 2 is a cross-section of the shaft or spindle in the bearing in which it reciprocates.

A is the pinion which turns the shaft or spindle X, and in the centre *b* of which the latter reciprocates. C is the reciprocating rubber. The square shaft X is adapted to a square hole in the hub of the driving-wheel or pinion A, which wheel or pinion drives the shaft or spindle.

The delay and trouble of removing the shafts or spindles when worn out are a source of much annoyance and expense, as the detaching of the tin cylinders and securing them to new spindles require tedious manipulation.

I make that part of the spindle which reciprocates upon or in its bearing of a polygonal shape in cross-section rather than to make it round, as by the former shape the wear is evenly distributed to the corners of the polygonal sides. When the shaft or spindle is square or polygonal, its bearing, in which it reciprocates, must of course be of corresponding shape.

I am well aware that an upright square spindle has been used in spinning-frames, as in English patent No. 2885, of 1856; also that in cloth-cutting apparatus a triangular shaft, extendible lengthwise in its bearings, has been used. These I do not claim; but,

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

In a carding-engine, a condensing or rubber cylinder mounted on a polygonally-shaped horizontal shaft, in combination with a driving-gear, A, having a sleeve-shaped bearing, *b*, said shaft and cylinder being adapted to be revolved by the drive-wheel A, and at

ingly polygonally-shaped bearing, said bearing and said shaft or spindle being of cast iron or of metal of the same crystalline structure as cast iron, and a continuously-reciprocating rubber, substantially as and for the purposes described.

2. In a carding-engine, the combination of a continuously-reciprocating rubber, a driving-wheel to turn said rubber, and a horizontal shaft or spindle connecting the two together, said shaft or spindle and the bearing in which it reciprocates being both made of cast iron, or both of metal having the same crystalline structure as cast-iron, whereby in the reciprocating action the tendency of the crystalline particles of cast metal in the bearing to wear the spindle will be resisted by the crystalline particles of the latter, substantially as and for the purposes described.

*In Testimony Whereof*, I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES GREAVES.

Witnesses:
WM. A. STEEL,
HUBERT HOWSON.

the same time to be rapidly and continuously reciprocated by suitable mechanism, substantially as and for the purposes described.

JAMES GREAVES.

Witnesses:
ALBERT E. ZACHERLE,
GEORGE H. SONNEBORN.

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The examination of the original patent shows that it describes, and describes as the invention of the patentee, the very thing claimed in the re-issue. Not only so; but it describes this invention as one of the things to be patented, and in substance claims it, though not in the technical claims following the specification.

There can be no doubt but that a re-issue of the original patent was proper, if not necessary, for its specification and its claims do not agree with each other, and it is apparent that one or the other requires amendment. On the mere comparison of the original and re-issued patents, it appears that the re-issue was taken to include in the claims the device which the original specification points out as an independent and leading feature of the invention, and that the re-issue to include this feature was applied for immediately on the issue of the original patent. There is no new matter in the re-issue specification, which only differs from the original in that a part of the original description is eliminated, having been imbodied in a divisional re-issue. (See Record, pages 117 to 120.)

I submit, therefore, that on the face of the patents there is not only no reason to question the propriety and validity of the re-issue, but every reason to assume that the re-issue was proper and necessary.

## Patent Office Record and Testimony.

As affecting the questions as to the re-issue, the facts shown in the Patent Office Record and the testimony are as follows:—

The application was filed in September, 1872, and was prosecuted in the Patent Office by one firm of attorneys until July, 1876, when Mr. Buckley was given charge of the case, with especial instructions to press for and obtain the allowance of a claim of similar scope to that of the re-issue. (See Buckley's deposition, page 27, folio 49.)

Mr. Buckley, in October, 1876, amended the application (page 72), and on November 29th, 1876, further amended it, redrawing the entire specification. (Page 76.)

On December 1st, 1876, the Examiner rejected the case (page 79), and the matter then seems to have been appealed to the Examiners-in-chief, who, on December 15th, 1876, decided that the case was allowable with amendment limiting the claims to the employment of cast iron in making the spindle and its bearing. (See opinion, pages 87 and 88.)

On February 9th, 1887, Mr. Buckley amended the claim so as to limit it to the use of a cast-iron spindle and bearing (page 81), and the same was allowed February 13th, 1877, and the original patent issued, bearing date February 20th, 1877. (Page 84.)

In making the amendment limiting the claim on the use of *cast iron* Mr. Buckley was, as he admits, acting not only without the knowledge of his client but in violation of the instructions given when the case was intrusted to him. His client, Greaves, remained in ignorance of the change in his claim until after the delivery of the patent, which was on March 7th, 1877 (page 26), and on seeing the patent he at once repudiated Buckley's action and directed him to surrender the patent and prosecute the claim for the combination having

for its leading element the square rub-roll shaft by a re-issue application, and such application was filed on March 24th, 1877. (Page 26.)

Having the matter thus again brought to his attention, the Commissioner reconsidered the question of patentability and allowed the claim on which this suit is brought.

Under the facts shown in the record and above noted, this case is clearly distinguished from any of those decided in this court, and in which re-issues were held to be invalid.

The original specification clearly indicates that the device covered by the re-issue claim was intended to be patented, therefore this case is not governed by the decision in Parker & Whipple Co. *vs.* Yale Clock Co., 123 U. S., 87.

There was no *laches* in filing the application for a re-issue, the original patent was surrendered practically as soon as granted, and there is no pretense that the public acquired, or could have acquired, any equities to offset the inventor's equity to a claim coextensive with his invention. Therefore, this case is clearly distinguished from Miller *vs.* Brass Co., 104 U. S., 350; Mahn *vs.* Harwood, 112 U. S., 354; Ives *vs.* Sargent, 119 U. S., 652, and the other cases where broadened re-issues have been held invalid.

There was no disclaimer filed in this case as in the case of Leggett *vs.* Avery, 101 U. S., 256, and Cartridge Co. *vs.* Cartridge Co., 112 U. S., 624. The disclaimers, the filing of which in these cases were held to estop the patentees from afterwards resuming the canceled claims by re-issue, are papers of a totally different character from amendments made in the prosecution of a case in the Patent Office. They are made under section 4917 of the Revised Statutes, which requires them to be *signed by the patentee*, witnessed and recorded, and, as is pointed out in the cartridge case, the disclaimer made under this section is "to the fact of invention." In both the cases referred to, the disclaimer was required by the Commissioner as a condition the extension of the patent, a matter committed by the law to his absolute discretion, and under such circumstances the attempt to resume the disclaimed right through the action of a subordinate in the Patent Office, was little else than fraudulent.

The case of Shepard *vs.* Carrington, 116 U. S., 593, also cited in the opinion of the lower court, would be in point if we were suing on the original patent and asking to have its claim construed as having the scope of the re-issue claim. The question in this case is whether the action of an attorney in limiting a claim in disobedience to his instructions and without informing his principal, can be repudiated after the issue of the patent by its *immediate* surrender and the filing of a re-issue application.

As I understand the rulings of this court they may be said to rest on two principles: *First*, that the invention covered by a re-issue must be one which is not only shown or described in the original patent, but which is described as being the invention of the patentee; *second*, that the statute passed by Congress to give express legislative sanction to the equity recognized by this court in Grant *vs.* Raymond, 6 Peters, 218, is not applicable to cases where no equity exists, or where a greater equity exists in behalf of the public, arising through the *laches* of the patentee.

In the present case it cannot be contended that the public had or could have any equity as against this re-issue, nor can it be contended that the patentee lost any equity he had to a re-issue by reason of *laches* or delay on his part.

In some of the cases decided by this court a doubt is expressed as to whether a re-issue can be sustained when it contains a claim which had been rejected and stricken from the original application with the acquiescence and consent of the patentee, but in all decided cases where this question has arisen, it was, I believe, complicated by the additional fact that the patentee had allowed his original patent to remain unaltered and unsurrendered for a number of years, thus signifying unmistakably his satisfaction with its claims and his acceptance and consent to the actions had in the Patent Office.

The re-issue law providing that patents may be corrected by re-issue when defective through inadvertence, accident, or mistake, means by these words exactly what courts of equity, in which *accident* and *mistake* have long been special grounds of jurisdiction, means by them. This is fully recognized by this

court in Miller *vs.* The Brass Company, and a glance at any elemental text-book on the principles of equity will show that the circumstances under which this patentee received his original patent in its defective form are clearly such as are defined to be within the meaning of the word "*accident*" and, as such, relieved against in the general jurisdiction of the courts of equity.

Bispham's Equity, section 174.

"It has been said by a celebrated writer that all attempts to define what accident, in its equitable signification, is, have been unsuccessful; nevertheless it has been described by a modern author to be an unforeseen and injurious occurrence not attributable to mistake, neglect, or misconduct; and this definition seems to be both accurate and comprehensive. A person who has been the sufferer from such unforeseen occurrence, which cannot be ascribed to his own negligence, folly, or fault, or possibly to his own gross ignorance as to the legal effects of his acts, is entitled, as a general rule, to relief in equity, because ordinarily the courts of common law did not in such cases afford redress."

It is, as Chief Justice Marshall said in the first re-issue case (Grant *vs.* Raymond), a solemn covenant which the laws of the United States hold out to inventors, that they shall have protection commensurate with their invention, and where by the joint mistake of the agent of the Government and the agent of the inventor a claim is omitted which the inventor was entitled to have allowed and never intended to abandon, it would seem to be the very type of a case where the equitable and legal remedy of re-issue should be applied to revest the inventor with the right which he never meant to surrender and which the law intends him to have.

No court of equity would hesitate to give relief under similar circumstances in other matters. Just think of it! An agent, under a mistake as to his principal's rights, surrenders without consideration a property which his principal never meant to surrender, to a party who is bound by solemn covenant to pay full value for the property, and has no wish or

desire to take it without payment; and before any act can have been taken, or intervening interests accrued, the principal calls for the correction of the mistake, and complies with the requirements of the law as to how mistakes should be corrected.

This court has not decided or intimated that it would decide that such a mistake so promptly corrected, nevertheless irrevocably deprives an inventor of his property.

Leggett *vs.* Avery and the other cases cited by the court below, and relied on by the appellees, relate solely to cases where a formal disclaimer is filed by the inventor himself, or where his consent and acquiescence in the omission of an important claim is to be legally and conclusively presumed from his silent acceptance and retention of the defective patent.

In Ives *vs.* Sargent, 119 U. S., 652, this court clearly implied that the inventor was entitled to relief by re-issue where his invention had been improperly claimed through the negligence of his solicitors and where (as was not the fact in that case) the inventor sought relief promptly after the issue of his patent.

The court below made no reference in their opinion to the other points taken in the answer, and urged at the hearing, against the validity of the patent in suit. Before discussing these questions in detail, I wish to impress upon the court certain undisputed facts in the case, viz. :—

I. The device in controversy, though simple, is of great importance, both as to its effect on the character of the work and its direct saving in the cost of repairs.

II. The patentee is unquestionably an original inventor of the device.

III. The patentee is unquestionably the first to have introduced the patented device into use.

IV. The defendants, and all shown to be using the invention, derived it directly, or indirectly, from the inventor.

These facts are the ear-marks of a meritorious and deserving invention. We are not here asking this court to give to mere holders of a patent the fruit of the enterprise and improvements made by others; but we represent the inventor and introducer of the very thing these defendants use; their benefactor, to whom, and to whom alone, patent or no patent, they unquestionably owe the benefits they derive from the invention in controversy.

## Defenses.

The defenses which the defendants set up are technical, not meritorious; for the most part they are attempts to make out that the inventor had forfeited his rights to a patent, a mode of defense not favored, or entitled to favor, in courts of equity. Outside of these allegations of forfeiture there are two other grounds of defense relied upon, to wit: It is alleged in the bill that the invention is "found described" in various publications, of which, however, only one, the English patent, No. 1247, of 1863, to Beaumont, is relied upon, and it is alleged that the patented device does not involve *invention* in view of other patents and publications offered in evidence. I will show your Honors that these defenses are even more technical and as little equitable and meritorious as are the allegations of forfeiture.

### *Anticipation by prior publication.*

The English patent to Beaumont, printed Defendants' Record, page 54, is the only prior patent or publication relied upon as imbodying a publication of the invention in controversy.

It is not even pretended that this patent contains any description of the invention, or that there is in the specification even a hint of such a construction as is described in our patent; but they say the drawing does indicate the use of a square shaft on some of the rub rolls, and they bring witnesses who say that they think this drawing imbodies the patented invention. This evidence is intrinsically of little value, but

such as it is we have fully rebutted it, proving that a machine constructed in exact accordance with the drawing not only would not, but could not, have the patented feature, and showing what the true meaning of the square-ended shaft shown in the drawing is.

We have been able to provide the court, through our expert, Mr. Jenks (see his evidence, pages 12 to 14, questions 10 to 19) with a true description—a specification of the mechanism shown in the Beaumont drawing; one which shows how it was meant to and can operate, while the interpretation put upon the drawing by the defendants' witnesses is clearly shown to leave the machine inoperative.

But, suppose this drawing had been less perfect than it is; suppose that we had not been able to show that our invention could not exist in it, and that so far as anything was shown it *might have* imbodied our invention, would this court hold that it was a prior patent or publication within the meaning of the statute. Certainly not under the ruling of the court in Seymour *vs.* Osborne, 11 Wall., 516, where this court passed on exactly such a state of facts; the old patent relied upon by the defendants in that case showing in its drawing a construction which might have been intended to illustrate the patented feature, but might also have been intended to show an entirely different construction. See also Reeves *vs.* Keystone Bridge Co., 5 Fisher, 456.

There is, it may be remarked, no attempt by the defendants to show that the carding-engines used in England before or after the sale of Beaumont's patent ever had our improvement upon them, or that anybody ever constructed a machine before or since Mr. Greaves' invention from the Beaumont patent, therefore when this drawing is rejected as not being an anticipation of the invention, you must find that Greaves was not only an original inventor and the first introducer of the patented improvement, but was also its first inventor, either in this or foreign countries.

The questions remaining for the consideration of the court are simply whether for one cause or another this first inventor and introducer of an unquestionably valuable invention is to be deprived of his patent.

## Invention.

The invention in this case consists of an improvement in carding-engines and relates to the particular part of the carding-engine known as the condensing-rolls.

The carding-engine is a machine consisting of a number of co-acting cylinders covered with leather or similar material, and having projecting from this elastic cover wire teeth. A mass of wool is fed into the front of the engine and seized by the toothed rollers, and by their conjoint action as it passes along between and around them they comb out the wool and deliver it to what is known as the doffer (a roll at the end of the cards or toothed cylinders) in the form of a smooth, well-combed fleece of considerable breadth and very small thickness. From the doffer this fleece is passed to what are called the condensing-rolls, the function of which is to compact the fleece and deliver it in the form of a cylindrical but untwisted thread or cord, which is then carried to the spinning-machine to be converted into a true thread.

The condensing-rolls are light tinned cylinders, which are secured so as to operate in pairs, one or both rolls in each pair having a reciprocating longitudinal movement as well as a movement of rotation; and each pair of rolls moves with somewhat greater speed than the pair immediately preceding it, so that while they are compacting the fleece by their rubbing action, as you would rub together a mass of loose material between your hands, they are also drawing it out.

Before Greaves' invention the condensing or rub rolls of the carding-engine were secured upon ordinary round shafts, which passed through the hub or sleeve of the driving-gears which gave them their rotating movement, and were engaged with the driving-wheels by means of a feather projecting from their surfaces and extending into a slot formed in the hub; they were thus free to move backward and forward in the hubs of the driving-wheels, while at the same time they rotated with the driving-wheels.

The rapid reciprocating movement of the rub-roll shafts in the hubs of the driving-wheels results unavoidably in a rapid

wearing both of the shaft and the hub, as a result of which they require to be frequently renewed; but a more serious result of this wear is that it permits an eccentric movement in the rub-rolls, whereby they lose their adjustment and alignment to the great injury of the work which they are performing.

Mr. Greaves' invention, as explained in his specification, consisted in mounting the rub-roll on a polygonal shaft, and combining it with a driving-gear having a sleeve-shaped bearing of corresponding form to that of the shaft. The result of this change in the construction of the condenser of the carding-engine is curious and interesting as well as vitally important to the users of such machines. The square or polygonal shaft and bearing serve, as did the feather on the round shaft, to engage the shaft of the rub-roll with the driving-wheel, so as to make them rotate together while permitting the shaft to reciprocate in the bearing or hub. The wear on the shaft and hub is equally great, but owing to the peculiar action of the machine the polygonal shaft and bearing take up the wear and maintain the rub-rolls in the same alignment and adjustment in which they are originally placed, notwithstanding the increasing size of the bearing and the decreasing size of the reciprocating shaft. This result is a consequence of the peculiar work which the rub-roll has to perform in drawing out the fleece at the same time that it compacts and condenses it. This drawing action tends to turn the roll in the opposite direction to that in which its driving-gear is turning it; that is, it brings into play a force directly opposing the action of the driving-gear. And the result of these opposing forces is, as the hub and shaft wear, to cause them to assume the position indicated by the sketch on page 95, folio 176; the result of which is to maintain the centre of the rub-roll always in the same line irrespective of the wear in its shaft or bearing.

This invention is one which is easily understood. Its merits and advantages over the old structures are almost obvious when you compare them. The natural principles and mechanical laws which govern its action are not difficult to understand. Once seen and appreciated it seems as though it would

be the most natural thing in the world to construct a carding-engine in this way. But this is equally true of almost all meritorious inventions; it is no basis for an argument against the existence of invention, but, on the contrary, in its simplicity and easy application lies one of its chief merits. If Mr. Greaves had improved the efficiency and durability of carding-engines to an equal degree by means of some complicated and intricate attachment, which it would take hours of study before you would understand how it operated, there would be no question of invention raised, but because he has effected this great improvement by simple means they say he is no inventor. Why, if this improvement was so obvious, was it never used before Greaves put it before the manufacturers? Thousands of carding-engines were in use which could have had this improvement put upon them in a few hours, and which for lack of it were doing their work improperly and costing their owners in mere wear and tear an enormous annual sum. It required but a thought and an experiment to improve the work and save the money, but no one had the thought or made the test until Greaves did, and his thought and test were invention if ever an invention were made.

Smith *vs.* Goodyear Dental Vulcanite Co., 93 U. S., 486, and cases there cited.

The defendants (appellees) have put in evidence the English patent to Davison & Crowther (Record, pages 48 to 53), and the American patent to Warth (pages 53 to 56). The first for a winding machine, and the second for a cloth-cutting machine. In both of these patents are found polygonal shafts rotated by gearing having bearings of corresponding forms. Neither machine, however, is even akin to the condenser of a carding-engine, and while the shafts are capable of an intermittent longitudinal movement in their bearing, they are not, in any sense, reciprocating shafts, as are those of the rub-rolls. The machines are totally different, and their conditions of use totally different from the rub-rolls of our patent, and neither in their construction or operation is there anything which ever did lead, or ever would have led, to the improvement in carding-engines which Greaves effected.

The appellees have proved that in two instances inventors of machines differing totally from a carding-engine have suggested the use of polygonal shafts instead of feathered shafts. The broad combination of a polygonal shaft with a polygonal bearing was, therefore, not new with Greaves, it was *per se* a known mechanical device. But Greaves took this device and combined it with others equally well known, and by his new combination he effected an improvement in carding-engines of the utmost value and importance, overcoming defects peculiar to carding-engines, and not existing in those machines where polygonal shafts had previously been used.

In the court below appellee's counsel, in support of his contention that the Greaves invention lacked patentable novelty, relied mainly on Saxon *vs.* Gloucester Wagon Co., 7 Q. B. D., 305, cited approvingly in Gardner *vs.* Herz, 118 U. S., 193, and on Railroad Co. *vs.* Truck Co., 110 U. S., 490. In the first of these cases the patented combination existed before, with the exception of two pieces of mechanism, *and their use for the purpose of doing what they did in the combination was well known.* But Greaves' square spindle and bearing, though a known device, was introduced into his new combination to do something which it had never done or been called on to do in the combinations with which alone it was old. So in the Truck case, the decision of this court turned on its finding that "no result substantially distinct in its nature" was secured by the patented combination—that is, that the combination of the swing-truck with an engine was to attain the advantages well known in its old combination with cars. If an advantageous co-action between the truck and the locomotive boiler had been shown to exist, by which more steam could have been obtained from the same amount of fuel, the court would undoubtedly have held the combination patentable, and the Greaves combination does attain an advantage as distinct from anything indicated in the old machines as that which I have thus assumed.

### Forfeiture by Public Use.

The statutory defense of forfeiture by public use for more than two years before the application for a patent is set up in the answer.

No attempt, however, was made by the defendants to show any use to have taken place more than two years before the date in 1872, when this case was filed in the Patent Office; they have, however, put in evidence certain parts of the papers on file in the Patent Office, with a view, no doubt, of showing that no specific claim was made for the invention now in controversy, until some two or more years after the filing of the application, and after Greaves had introduced his invention into use.

As to this defense, I beg to submit the following points:—

I. The invention was described in the application as filed. Had it issued as a patent in its unamended form, the invention would have been described clearly enough to prevent the inventor or any one else from obtaining a later patent for it.

II. The right to amend the specification and claims of an application is undoubted; and where this right has been exercised to claim features unquestionably the invention of the patentee and omitted from the first claims by accident, inadvertence, or mistake, it has never been questioned but that such claims related back to the filing of the application. There would clearly be no justice or equity in visiting upon a patentee a penalty for delays in the Patent Office which are beyond his control, and, therefore, unless fraud is shown, all actions taken between the filing of an application and the issue of the patent should legally and equitably be considered as of the date of filing.

Singer *vs.* Braunsdorf, 7 Blatch., 421;
Manufacturing Co. *vs.* Railway Co., 33 O. G., 355;
Howes *vs.* McNeal, 15 Blatch., 101;
Jones *vs.* Sewell, 3 O. G., 630;
Henry *vs.* Francistown Soapstone Stove Co., 9 O. G., 408; 2 B. & A., 233;
Railway Co. *vs.* Sayles, 97 U. S., 554.

III. The allegation of forfeiture by public use is a mode of defense not favored by the courts, and it has never been

sustained where the inventor has taken any action in the direction of seeking legal protection by applying for a patent within the statutory period.

Abandoned applications filed before the ones on which the patent issued have been held to avoid the forfeiture.

Henry *vs.* Francistown Soapstone Stove Co., 9 O. G 408;
Godfrey *vs.* Eames, 3 O. G., 638;
Graham *vs.* McCormick, 10 Biss., 39;
Blandy *vs.* Griffith, 3 Fish., 609;
Goodyear Dental Vulcanite Co. *vs.* Willis, 1 Flip, 388.

The placing of the application in an attorney's hands for filing has also been held to prevent the forfeiture, even though through the negligence of the attorney, it was not filed for two years afterwards.

Birdsall *vs.* McDonald, 6 O. G., 682.

Any amount of use in public when made to test or estimate the value of the invention is held to be permissible without working a forfeiture.

Elizabeth *vs.* Pavement Co., 97 U. S., 126;
Pitts *vs.* Hall, 2 Blatch., 229.

Even sales made two years before the application was filed are held not to deprive the inventor of his property if made with a view of getting practical tests of the efficiency or value of the invention.

Innis *vs.* Oil City Boilerworks, 30 O. G., 308;
Graham *vs.* McCormick, 5 B. & A., 244.

It would be, I respectfully submit to your Honors, impossible to reconcile a decision against this patentee with the evident spirit and meaning of the long lists of cases where this question of forfeiture has been considered by the courts, and I am satisfied that no decision can be cited by the defendants where the patent of an original and first inventor has ever been held invalid under the same or similar circumstances.

In the court below defendants' counsel relied on the case of Sayles *vs.* Railroad Co., but what Mr. Justice Bradley said in that case was, that "if the annexed application and model filed by Tanner five years later (than his original application) imbodied any material addition to or variance from the original—*anything new that was not comprised in that*—such addition or variance cannot be sustained on the original application."

In Greaves' case there is no question but that the invention was comprised in the original application. There is no question but that these defendants and all other users of the invention derived it from Greaves. Mr. Schofield, on whose machines the invention was first applied in 1871, was examined for the defendants. (Page 29.) Joseph Lees, one of the defendants, testifies that he knew, in 1872 (the year Greaves applied for his patent), that Greaves was applying for a patent to cover the square rub-roll shaft, and it is thus apparent that both the fact of Greaves' invention and his intent to protect his invention were known from the first, and that the users must have known that their use was liable to become an infringement on the issue of Greaves' patent. I submit that the users could not gain or Greaves lose any equity under such circumstances.

FORFEITURE BY PRIOR PUBLICATION IN ANOTHER PATENT.

This defense is based on patent No. 152,628, granted to Greaves June 30th, 1874, and printed, Record, pages 122, 123. The application for this patent was filed in April, 1874, long after the filing of the application on which the patent in suit, or, rather, its original, was issued. The patent of 1874 does not show or describe the combination claimed in our re-issue; on the contrary, it refers to the keyed shaft as representing the state of the art, but it shows and claims another adaptation of the idea imbodied in the re-issue, that is, it shows a square shaft, on which the roll slides, the shaft remaining stationary in a longitudinal direction, and the great advantage of this construction is pointed out as being that the bearing exposed to wear is thus greatly increased *in length*, and its wear proportionately decreased.

The defense is not maintainable, I submit, (*a*) because the patent of 1874 does not describe or show the invention of the re-issue; (*b*) because the re-issue is founded on the earlier application.

THE DATE OF THE RE-ISSUE.

In the third paragraph of the defendants' answer, they allege, as another ground why the patentee had forfeited his invention, that this re-issue is of later date than another issue on the surrender of the same original patent. The propriety and legality of such a re-issue was submitted to the Attorney-General in this very case, and on this point it is only necessary to refer your Honors to his opinion printed in 16 Opinions of the Attorney-General, page 570.

Respectfully submitted,

FRANCIS T. CHAMBERS,
*Counsel for Complainants.*

# Supreme Court of the United States.

JOHN DOBSON, *et al.*,
*Appellants and Plaintiffs below,*

*vs.*

JAMES LEES & SONS,
*Appellees and Defendants below.*

## COUNTER STATEMENT OF THE CASE.

The defendants began the use of the machinery complained of as an infringement prior to May, 1872. (See record, pages 34 and 38.) They are owners of woollen mills, and have condensing carding engines in use, which, prior to May, 1872, they altered only in the respect of changing the rub roll shaft from round to square. In all other respects the machinery remained precisely as they had been using it. (See record, pages 34 and 38.) They did not learn of this alleged invention from or through the patentee Greaves as claimed in appellant's brief; though they did hear of his claim at or about the time of his application for the original patent. (See record, page 39.) Several months after the defendants had put this alleged invention into use at their mills, the patentee filed the application for his original patent, viz: October 29, 1872. The specification first filed with that application contained a single claim for making such spindles or shafts of cast-iron, irrespective of shape. (See record, page 62.) After various

rejections, and more than two years after the filing of the original specification, an amended claim was put in for *shape* of the shaft, and with it an additional sheet of drawings. (See record, page 66.) The additional sheets of drawings is the sheet 2 preceding page 115 of record.

After various rejections of this claim by the Primary Examiner, the Appeal Board, and the Commissioner, the original patent was granted February 20, 1877, with two claims, one for the cast-iron material of the shaft, and the other for the cast-iron material when the shaft was made square. Within a month after the issue of this original patent, it was surrendered, and application made for a reissue of it in two divisions as they now appear, division A being for the shape of the shaft only; division B being for the shape plus the material. Division A is the patent in suit, and it was granted after numerous rejections (see file and contents, record, page 104), on March 7, 1882.

The bill in this case was filed July 21, 1882, more than ten years after the defendants had begun the use of the alleged invention in question. The defences to the bill are substantially as stated in the appellant's brief, namely (1), that the reissue in question is void as not being for the same invention for which the original patent was granted. (2) That the re-issue is void because it claimed matter which had been disclaimed in the application for the original patent, and withdrawn a condition precedent to the grant thereof. (3) That the reissue is void because on the surrender of the original patent, two additional reissues were applied for, which were issued at different times, that in suit being the last. (4) That the reissue is void because the device claimed therein, in view of the state of the art, as disclosed by the patent itself, the application

therefor, and the testimony in the case, did not involve invention or patentable novelty. (5) That the reissue is void because the alleged invention attempted to be claimed thereby constituted no part of the application for the original patent as first filed, and did not appear therein until inserted by amendment more than two years and three months after the application was filed, and nearly three years after the defendants first put the alleged infringing machinery in use in their mills.

A replication was filed to this answer, and proofs taken, and the case argued. The Court dismissed the bill. All the allegations of fact above mentioned were fully proven by the evidence offered, although the Court in its opinion (see record, page 123) did not deem it necessary to consider any point except the invalidity of the reissue on the ground that it was not for the same invention for which the original patent was issued.

## Subject-matter of the Alleged Invention; and herein of the State of the Art.

The several defences presented in the Answer raise questions both of law and of fact, the printed record containing the proofs adduced by the defendants in support thereof. To a proper understanding of either, however, it will be necessary not only to examine the nature and scope of the alleged invention, but to review the history both of the original patent and of the division A of the reissue based thereon. Division B of the reissue is a reproduction of the claims of the original patent, and, therefore, no comment on it is necessary. Division A of the reissue is the only patent involved in this suit. It is printed on pages 120 and 121 of the record. The drawing

of division B is opposite page 117 of the record, and its specification is on pages 117 to 119. The original patent is on pages 114 to 116 of the record.

The combination of mechanism involved is exceedingly simple, and may be briefly described. It is applicable to a condensing carding engine, in which are a number of horizontal tin cylinders, between which the wool sliver or roving passes and is rubbed and drawn. These tin cylinders (sometimes called rub-roll cylinders) have simultaneous rotary and endwise motions. To secure this action, they are supplied with metal shafts, upon which is mounted a toothed driving wheel. The shaft has its bearing in a sleeve or hub of any known external form. The alleged invention consisted in taking these old parts, without any alteration whatever except to make the shaft square or polygonal, and the recess of the bearing hub of the same shape, instead, as formerly, of having the shaft round with a spline or feather. By turning to the record at page 114, sheet 1 shows the round shaft with its feather, and the next succeeding page contains sheet 2, showing the shaft square, and how it is applied to the rubbing cylinder and the bearing hub. The toothed driving wheel shown in the drawing operates to produce the rotary motion of the shaft, but the endwise motion is produced by an eccentric mechanism long used in connection with carding engines, and is not shown in any of the drawings of the appellants' patent; a general idea of it, however, sufficient for the purposes of this case, may be obtained from the drawing of an English patent opposite page 60 of the record.

Such is the mechanism involved; and the single claim of the reissue A in suit is for the combination in a condensing carding engine of the tin rubbing cylinder and its shaft,

toothed driving wheel, and the recessed sleeve or bearing hub, *when the shaft which operates the tin cylinder is made square or polygonal in form and the recess of its bearing hub of corresponding shape.* The patent, as well as the evidence, admits and proves that all of the elements of the claim, separately, and also in the precise combination, are old and well known, saving only the *form* of the shaft; the alleged invention consisting solely in the *form* of the shaft as a substitute for a round shaft provided with a spline or feather, which latter is a strip of metal let into the shaft in the direction of its length (see drawing opposite page 114 of record) and is to enable the shaft to be turned by the bearing hub, which is recessed longitudinally of the same shape as the shaft and its feather or spline. In all other respects the mechanism was left unaltered by the patentee, and otherwise remains precisely as it has existed for many years, excepting only that (as claimed in the original patent and in the other division B of the reissue) the patentee constructed both the shaft and its bearing hub of cast iron, or metal of the same crystalline structure as cast-iron, under the theory that less attrition of the parts would be produced thereby. That feature, however, is not involved in this controversy. This statement of the state of the art is fully established by the evidence contained in the record, and is not understood to be disputed by the appellants.

## History of the Application for the Original Patent.

The original patent was applied for September 30, 2872. (See file of application, Record, pp. 83 and 84). The specification first filed contained a single claim, viz: "the application of cast-iron spindles to the condensing cylinders of carding engines." It was accompanied by a single

sheet of drawings, viz; Sheet 1, opposite page 114 of the Record. The whole tenor of its descriptive part, together with the opening statement of invention, clearly shows what the inventor then thought was his invention, namely, to use the language of that specification, the making of spindles "of a more durable character," by constructing them "of cast iron instead of wrought iron or steel." This application was rejected October 29, 1872, again rejected December 7, 1872. Exactly two years afterwards, and just in time to save the case from being treated as abandoned under the rules of the Patent Office, the attorney struck out the claim mentioned and substituted therefor the following claim, viz: "A spindle for carding machine rollers rectangular in form, for the purposes set forth." (See Record, page 66). This formal amendment was followed by a new oath of invention dated January 22, 1875, and a rewriting of the specification containing a claim substantially as it appears now in division A of this Record. (See Record, pages 67 and 68). And this amendment was accompanied by a new sheet of drawings, namely: Sheet 2, preceding page 115 of Record. (This latter is the only sheet of drawings appearing in this division A of the reissue, the other having been eliminated). It is also interesting to note that a new model was filed with the additional sheet of drawings. Presumably the old model did not show the *square* shaft; certainly it did not if it accorded with the drawings first filed, to wit: the sheet opposite page 114 of the Record. This amended specification was rejected upon reference to the three several prior patents put in evidence in this suit. Rejected first on January 27, 1875, again on February 26, 1875, again on March 31, 1875, again on appeal to the Board of Examiners in Chief August 7, 1875, and again by the Commissioner on

appeal to him, November 11, 1875. (See file and contents, Record, pages 62 to 83, and the full text of the Commissioner's decision of November 11, 1875, on page 85 of record). It would seem that this ought to have been the end of the case in the Patent Office, but about a year afterwards a change of attorneys occurred, and the new attorney, having obtained leave of the Commissioner to reopen the case, filed an amended specification October 12, 1876. (See Record, page 72). A rejection followed, November 27, 1877. Again the specification was amended November 29, 1876, rejected December 1, again amended December 15, with two claims. (See Record, pages 78 and 79). Claim 1 being for the matter now in reissue division A, and claim 2 for the cast-iron features, irrespective of the shape of the shaft. From the examiner's rejection of these claims (see his official letter, Record, page 86), an appeal was taken to the Board, which affirmed the Examiner, rejecting the claim covering the shape of the shaft unless the applicant inserted in the claim the cast-iron feature in combination therewith; and allowed the other claim which covered the cast-iron feature irrespective of shape. (See record, bottom of page 87 and top of page 88). That decision was made December 15, 1876, and in it the Board of Examiners say: "the first claim as it stands (the claim which now appears in the reissue, division A) is properly rejected, but if amended to include 'cast iron or metal of the same crystalline structure,' for bearing and spindle, we think it would be admissible so far as anything appears." In accordance with this requirement, and no doubt in accordance with the suggestion thrown out on the argument of the appeal, the attorney filed a paper dated December 14, 1876, amending the claim accordingly. (See Record, top of page 80). Following this, on January 11,

1877, an interference was declared between these amended claims and the application of one J. M. Stone. Motion to dissolve this interference was refused by the Examiner but allowed by the Commissioner on appeal. (See Record of both opinions, pages 89 to 91). An examination of the Commissioner's order dissolving this interference shows that he did so on the ground that although Stone's case showed the square shaft, it did not show the cast-iron feature; and his order dissolving the interference was conditioned upon Greaves making an amendment even more specific than previously required by the Board of Examiners on the hearing of the *merits* of the application. In consequence thereof, the applicant filed an amendment February 9, 1877. (See Record, bottom of page 81). Comparing the amendment filed December 14, 1876, as required by the Board, with that filed as required by the Commissioner in dissolving the interference, it will be seen (see Record, top of page 81) that the claim was first limited to a mechanism in which the shaft and its bearing were both of a metal of the same crystalline structure, whereas in the other and later amendment the Commissioner required the words "as cast iron" to be inserted, more specifically defining and limiting the kind of metal intended. The application was then allowed finally, and the patent issued February 20, 1877. Thus, after nearly five years of persistent and continuous fighting in the Patent Office and after repeated hearings by every tribunal of that department, Greaves obtained all that under the most liberal construction he was entitled to have, and which appears in his original patent. (See the Patent, on page 114, of Record).

## History of the Re-issues—Divisions A and B.

Almost immediately after obtaining the original patent the plaintiff, Greaves, assigned a half-interest to his co-complainants, and filed an application for a reissue in two divisions, one for the same two claims as found in the original, and the other division for the same matter as the first claim of the original, *omitting the cast-iron feature*, thus attempting to claim, in one division of a reissue the same matter which the Examiner, Board of Examiners in Chief, and the Commissioner had rejected as far back as November, 1875, in the case as originally presented by Messrs. Howson, and the same matter which the Board of Examiners in Chief had rejected in the case as amended by Mr. Buckley, and which matter both the Board of Examiners in Chief and the Commissioner had, by the decisions of December 15, 1876, and February 9, 1877, above referred to, compelled the applicant to erase and amend before allowance of the original patent, and as a condition precedent for a dissolution of the interference.

The result of this application for divisional reissues, was the allowance of Re-issue B (not involved in the case at bar). which is the same as, and contains both the claims of, the original patent, as will be seen by comparison with it. The patentee made sure, by a division of his reissue application, to secure by one division of his reissue, all that was covered by his original patent. The other was an attempt to worry and harrass the office into giving him in a separate patent, the identical thing, which had been repeatedly rejected in the application for the original patent, and which he was compelled to withdraw, as a condition of its allowance. (See Record, page 117). The application for Re-issue A (the patent in suit) was rejected by the Primary Examiner and the grounds therefor

fully stated, which were in part as above set forth. [See file and contents of this application, printed in Record, pages 91 to 114.] See Examiner's first rejection, Record, page 94. The applicant then appealed to the Board of Examiners-in-Chief, who affirmed the Examiner, and an appeal was taken to the Commissioner, who reversed the Board. [See Vol. of Commissioner's Decisions for 1877, page 80.] The case was then again put in interference with Stone, and decided in Greaves' favor as against Stone. The Primary Examiner then cited newly-discovered prior patents and rejected the application. An appeal was taken to the Board. [See statement of Examiner, Record, pages 105 and 106.] After a favorable decision by the Board, the Commissioner sent the case back to the Examiner for report on the effect on this application of then recent re-issue decisions of the Supreme Court. [See Examiner's two statements, the first printed in Record, at bottom of page 102, and top of page 103; and the second printed in Record, pages 106 to 111.]

There are other matters in this file and contents bearing upon the questions of novelty and patentability; but the references above made, are here made at this stage of the argument only to call attention to the invalidity of the re-issue in suit for new matter appearing upon its face, after comparison with the original patent, and the file and contents of the application therefor. This defence will be more elaborately discussed hereafter in its proper place in this brief.

I. *As to the novelty and patentability of the device covered by Re-issue A.*

Bearing in mind that the precise combination claimed is admittedly old, except in the shape of the shaft and the recess

of its hub, viz.: Square or angular, instead of round with a spline or feather—the question of patentability ought not to be difficult of solution when considered in the light of the evidence as found in the patent itself, and in the proofs. It is alleged on the part of the plaintiffs that the square shaft and bearing produce greatly increased durability over a round feathered shaft and bearing, and hence that the rubber cylinders work more truly with respect to each other, for a greater length of time, with the former than with the latter form of shaft. This is what the patent sets forth, and it is no doubt true, with a *single* feathered round shaft. Why? The answer is the answer to the main question. The allegation is, not that there is a difference in principle of operation, but a difference in *degree* only of *result* produced. And this difference is due to the fact that an *angular* shaft, whether it be a flat bar, a triangular bar, a square bar, an octagonal, or any other polygonal form of shaft, presents, in the *rotation* of the shaft (which is simultaneous with its sliding motion) more than one angle for frictional contact. [See testimony, Record, page 18, questions 37 and 38.] It is contended on behalf of defendants that the patent on its face discloses nothing patentable. If there was anything new in the operation of the parts, or any new result produced, by substituting the square shaft for the feathered round shaft, the case would be (if the use of an angular shaft in such or analogous cases was itself new) a wholly different one; but there is not even that. Neither the patent nor the evidence in support of it contend for more than a difference in *degree* of result, viz.: Increased durability, or rather more *evenly distributed* wear; and this difference in degree of result is produced by additional *angular* points of contact, in a triangular, square, or any polygonally shaped

shaft, over a round shaft with a single angle presented by the longitudinal feather or spline. The original patent shows in one figure of its drawings a round shaft with a single feather [the Reissue A drops this sheet of drawings entirely], but the evidence shows that in case of shafts for such simultaneous rotating and sliding movements, it has been common to insert more than one feather in the shaft, so that the result, as in the case of a shaft with four feathers at opposite points on its periphery, is precisely necessarily the same as though the shaft was square, for it presents four points of contact with the bearing; and so, if provided with two, it would be equivalent to a flat shaft; or if provided with three, to a triangular shaft. This use of *two* feathers was well known and used (see Record, page 19, questions 47 and 48); also admitted by plaintiff's expert. Undoubtedly, then, if a round shaft with two, three, or four feathers or splines acted in precisely the same manner and produced the same effect, even in degree as it does, it would be substantially the equivalent of the polygonal or square shaft, and within the terms of this reissue claim; yet this is old as respects the use of *two* feathers, and even if it were not old to put *four* feathers on a round shaft, and so make it the mechanical equivalent of a square shaft, such a use, instead of one feather, or two feathers, or even three feathers, would not constitute patentable novelty over the use of one feather, not only because it is obvious that the more bearing or contact surface, the less wear or more evenly distributed wear, but also because the result claimed is not a new result, but a mere difference in *degree* of the same result, for both shafts reach the same state of wear and unevenness in course of time.

In this connection it is to be noticed that two of the prior patents offered in evidence—Warth's and Davison's—are both

disclaimed in the reissue. Let us see the effect of this on the patent in suit; and particularly why, in view of these patents and of this disclaimer, the Patent Office found anything patentable in the Greaves' shaft. The Warth patent is printed in full in Record, page 53, and describes a cloth-cutting machine, in which it is necessary to give to the driving-shaft precisely the same motion as in the carding-machine, viz.: a simultaneous endwise sliding and rotating motion; hence, this patent says "the tubular shaft, g, is bored out to receive the sliding-shaft C, which is, by preference, made *triangular*, but which may be formed in any desirable manner, so that it will not turn in the tubular shaft, while it is free to slide therein." In this case we have a triangular shaft, fitted to a corresponding-shaped hub or sleeve-shaped bearing, and having precisely the same motions as in plaintiffs' case. But it is contended that it is not an anticipation (and so regarded by the Patent Office *finally* in the re-issue application), because, forsooth, it is not described as used in a *carding*-machine. On the application for the *original* patent, however, it was deemed a complete anticipation. See Commissioner's decision, Record, page 85.

Again, the Davison patent, printed in full in Record, page 48, which is for a new construction and arrangement of spindles for a yarn-winding machine, described the spindle-shaft and its bearing as follows: "The top of this cap consists of a plate, D′, fixed thereto, and having a *square* hole through it, fitted to receive the *square* part of the spindle, from 2 to 8 (referring to Fig. 4 of the drawings), which *slides* freely therein; and when the cap-piece *rotates* it carries the spindle around with it." Here again, we have a simultaneous sliding and rotating shaft, in a corresponding-shaped bearing, and in this

case it is square; but this patent is held not to anticipate, solely because the mechanism is in a yarn-winding machine, and not in a carding machine, and, therefore, it is necessarily a vertical spindle, and not a horizontal one, and hence could not wear as much on its longitudinal sides. It seems almost incredible that any patent solicitor could, by argument, or perhaps persistency, so warp the judgment of the Commissioner (for it will be noticed that both the Examiner and Board were reversed by him on this point), as to induce him to grant a patent upon such unsubstantial and insufficient differences, especially after a refusal and rejection by a prior Commissioner (see Record, page 85) on the application for the original patent, and after repeated rejections by the Primary Examiner and Board of Appeals,—the latter saying in their opinion (see Record, page 88), "*the shape of the hole for the bearing, and the corresponding shape of the shaft, are of little importance, since the same device has long been used as equivalent to spline or feather for similar purposes.*"

But the record furnishes an additional prior reference—English patent to Beaumont—see page 57. This time it is for precisely the identical machinery—a condensing carding engine—and it elaborately describes the motion of the shafts or spindles, but unfortunately does not *describe* the *shape* of the shafts, while, however the *drawings* clearly show them to be square; see Figs. 1 and 2 opposite page 60. This English patent is fully and elaborately discussed and explained by the Primary Examiner in his "Answer to Reasons of Appeal;" see Record, pages 112 and 113, folios 205, 206, and 207. In addition, however, to the cases therein cited, the Supreme Court has very recently held that an invention may be described to the mind by *lines* as well as by *letters*, and hence if a draw-

ing is the best means of describing the things patented (depending upon its character), the patent would be good even though the specification contained no description in *words* (the drawings being part of the specification); see Dornan *vs.* Dobson, 118 U. S.; and it was said Loom Co. vs Higgins, 105 U. S., that a drawing alone is sufficient anticipation if fully understood by those skilled in the art.

In the case at bar, the drawing shows beyond question, in both Figs. 1 and 2, a square shaft marked AA in both figures, and also round shafts marked BB; this is so plain to the eye, that (as the Examiner remarks in his opinion) it is impossible for any one skilled in such machines (unless he be a blind man) not to see and understand it. Indeed, while the cross sections in Fig. 2 show the square ends, the shading on the top view of the shafts in Fig. 1, also show which shafts are round, and the absence of it on the square shafts. This is a well known rule in draughting, and is illustrated by the drawing in the other patent in this record (see opposite page 58); the *shaded* part being *described* as *round*, and the *unshaded* part being *described* as *square*. But, while it is not understood that the plaintiffs can or even do attempt to deny that this English patent and its drawings do not show a square shaft on the upper rub-rolls, they contend that they simply rotate and have no endwise motion, while admitting that the lower round shafts have both, and this is attempted to be reasoned out by far-fetched conclusions, based upon assumptions as to the position of the eccentrics which operate the shafts, and by comments on a drawing which incompletely shows the whole mechanism of the condenser card, *but which does show in detail every part of such a carding engine involving the mechanism here in dispute*, as fully and more so,

than is shown in the plaintiffs' re-issued patent in suit (which contains no drawing or even description of mechanism to produce this endwise motion), as the Primary Examiner also apply remarks in his opinion, when the same point was made before the Patent Office as is now made here.

Apart from the proofs of want of novelty, and considering the subject of patentability upon the facts disclosed in the patent itself, and without other evidence *aliunde*, we must inevitably be led to the conclusion that the alleged improvement does not involve invention, even though conceding that it is useful. While the claim is necessarily drawn for a combination of elements, it is admitted that each and every of these elements existed before, and, also, that each and every of them, in precisely the same combination in the same machine, was not novel with the patentee, saving only the substitution of a multiangular shaft for a uniangular one; for "polygonal" in the patent must include any shaft having *two* or more angular edges longitudinally, because such a shaft would accomplish the results described in the patent (see testimony of appellants' expert. Record, page 18. Questions 40 and 41); and by uniangular is meant a shaft with a single longitudinal spline, for such it is in respect to the purpose to which it is applied in this mechanism; and in substituting the former for the latter, our present purpose is to discover whether the patent itself (without the aid of other evidence) discloses that by such change a difference, either in principle of construction, operation, or result, is produced. It is not claimed that there is a difference in principle of construction, nor that there is even any difference in *kind* of result; but patentability is claimed for the change, solely on the ground that there is a difference in *degree* of the *same* kind of *result*. It will be difficult for

the plaintiffs to find any well-considered decisions which hold that such a result will impart patentability to an obvious mechanical change in the mere form of a single element of a combined aggregation of mechanism.

But the case is even worse for the plaintiffs when, in considering this question of patentability of the substituted form, we look at the evidence of the state of the art, and discover that the same form of a like element, having the same motions, is found in other machines, especially in other machines for working the same material in the next subsequent stage of its manufacture.

Did it require any invention to increase the number of longitudinal splines or feathers on the round shaft from one or two to three or four, in view of the fact that increased bearing surface (in the rotating movement) against the bearing-hub would give increased length of life to the body of the shaft, or rather more evenly-distributed frictional attrition? Or did it require invention to take the vertical spindle-shaft and bearing, from the spinning machine, and place it horizontally on the condensing carding engine—both of which machines work side by side in the same mill, in successive stages of textile manufacture? Or did it again require invention to take the triangular shaft of the cloth-cutting machine—which is *horizontal* and has all the motions of the shaft in question—from that machine and place it on the carding engine?

The further the subject is considered the more irresistible becomes the conclusion that the patent discloses no change involving invention, not even a *double* use of the square shaft, but really and in fact the same or an analogous use to that to which it had already been long applied.

The recent decisions of the Supreme Court leave no room for doubt that neither in the case of a mere change of form in a piece of mechanism, nor in that of an application to a new use (without change of form) of an old and well-known piece of mechanism, without producing thereby anything more than difference in *degree* of result, does not amount to invention, and is not sufficient to sustain a patent.

In Gardner *vs.* Hertz, 118 U. S., 191, the patentee contended that, "unless substantially the same thing existed before, the article, if useful, is new and patentable;" but the Court refused to accept this doctrine, and held—citing and approving Thompson *vs.* Boisselier, 114 U. S.—that under the Constitution, a patentee "must be an inventor, and he must have made a discovery;" that under the Acts of 1836 and 1870, and Sec. 4,886, Rev. Stat., "it is not enough that a thing shall be new, in the sense that, in the shape or form in which it is produced, it shall not have been before known, and that it shall be useful, but it must, under the Constitution and the statute, amount to an invention or discovery." See also Vinton *vs.* Hamilton, 104 U. S., 485, and Hall *vs.* Macneale, 107 U. S., 90, both involving the question of patentability, in which apt illustrations are furnished for the solution of the same question in the case at bar. And see also, Thompson *vs.* Boisselier, *supra*, in which, on page 12, the cases on this point are collected and referred to, especially Hollister *vs.* Benedict Manufacturing Company, 113 U. S., 59, in which the Court said: "the thing claimed was new in the sense that it had not been anticipated by any previous invention, and it was shown to have superior utility, yet it was held not to be such an improvement as was entitled to be regarded, in the patent law, as an invention."

There was a recent instructive case in England (in which the question of *patentability* was made to depend on the *quantum* of inventive skill involved), Saxon *vs.* Gloucester Wagon Company, 7 Q. B. D., 305, argued on appeal, and cited and approved in Gardner *vs.* Hertz, 118 U. S., 193. There the specified patented combination did not exist before, but it existed *with the exception of two pieces of mechanism, and their use for the purpose of doing what they did in the combination was well known;* but it was held that the combination might have been made by any intelligent mechanical workman with no other instructions than those contained in a prior patent to the same inventor, and that there was no novelty in the combination sufficient to sustain a patent.

In our own reports, Pennsylvania R. R. Co. *vs.* Locomotive Truck Co., 110 U. S., 490, furnishes additional authority; wherein, after citing numerous cases, the doctrine is stated that "the application of an old process or machine to a similar or analogous subject, with no change in the manner of application, and no result *substantially distinct in its nature*, will not sustain a patent, even if the new form of result has not before been contemplated." So in Smith *vs.* Goodyear Dental Vulcanite Co., 93 U. S. 494, the thing patented differed "not merely in *degree* of usefulness and excellence," etc. So in Blake *vs.* San Francisco, 113 U. S., 688, the Court said: "if the result claimed as new is the same in character as the original result, it will not be deemed a new result for this purpose."

A precisely parallel case to the one at bar, is Harwood *vs.* Railway Company, 2 B. & S., 194, and 11 H. L. Cas., 654, cited, extensively quoted from, and approved in R. R. Co. *vs.* Truck Co., *supra.*, p. 496, in which the patentee claimed

making the fish-plates for connecting ends of rails, with a groove or recess in their outer surface, so as to receive therein the square heads of the bolts or rivets and prevent them turning around while the nuts on the other side were being screwed on or off, and also to avoid the danger of the flanges of the wheels of the cars striking against the nut heads. It was proven that bridge timbers had been supported, and also two of them joined together at their ends, by large flat plates of iron, one of which was grooved to receive the square head of the bolt passing through the timbers and plate, and thus subserved the double purpose of adding strength as well as preventing the heads of the bolts from turning round. Though this patent was sustained in the Court of Queen's Bench, the judgment was unanimously reversed in the Exchequer Chamber, and judgment of reversal affirmed in the House of Lords, the latter tribunal holding that "the channelled iron was applied in manner which was notorious, and the application of it to a vertical fish-plate would be no more than the application of a well-known contrivance to a purpose exactly analagous or corresponding to the purpose to which it had been previously applied." In that case the application of the alleged invention was to a vertical use, while in the anticipating device it was horizontal. In the two kinds of uses, it was far more widely separated than in the case at bar; and in the patented application it even subserved an additional purpose (viz., avoiding danger of the bolts striking the flanges of the car wheels) not present in the anticipating application of the device; just as here, where patentability is said to reside in the fact that use of the shaft is horizontal and not vertical, and in the alleged fact that in the substitution of the polygonal shaft for a round shaft and feather, an analagous and obvious purpose of *longer* and *truer*

wear of the parts is accomplished. If the law as stated in that case, and as cited and approved by the Supreme Court, is to be interpreted and applied according to the illustration furnished by the subject-matter of the suit, it more than covers the point under discussion in the case at bar.

II. *The re-issued Patent* A *and comparison of it with the original*

As before remarked, the original patent contained two claims, both for shafts of *cast iron*, one round and the other square. One division (B) of the re-issue, contains both these claims, while the other division (A), which is the one in suit here, is for a square shaft irrespective of the material of which it is constructed. It cannot successfully be contended that it is not for a different invention from the original, and presumably the plaintiffs intend to argue in favor of its validity, *notwithstanding that fact*. While many early decisions are reported in the books sustaining such re-issues where the application file, the specification, the drawing, or even the model of the original patent, afforded the slightest ground for warranting claims in a re-issue for something additional to, or not covered by the claims of the original, yet beginning in 1879 with Leggett *vs.* Avery, 101 U. S., 593, and others since of like character in which the authorities on this point are collected, discussed, and approved, the Supreme Court has gradually reached that point where it positively refuses to sustain any re-issue claims for something additional to or different from the mechanisms covered by the claims of the original case and rejected, no matter what the excuse may be for the re-issue application. In brief, that no re-issue shall be valid *under any circumstances*, for any new claims covering

mechanisms or sub-combinations, thereof, not included within the claims of the original, [and thereby rendering it a patent for a different or additional invention from that for which the original was issued or intended to secure], where the matter of such new claims was passed upon and rejected or withdrawn, in the application for the original patent, as in the case at bar.

The power of the Commissioner to grant a re-issue is expressly confined by the statute to the identical thing originally patented, or intended to be patented; and where it appears on comparison of the two instruments as matter of law, that the re-issued patent is not for the same invention as that embraced and secured in the original patent, the re-issue is invalid, as that fact shows that the Commissioner in granting the new patent, exceeded his jurisdiction. Seymour *vs.* Osborne, 11 Wall, 516; Gill *vs.* Wells, 22 Wall, 1; and for divisional re-issues, see Powder Co. *vs.* Powder Works, 98 U. S. 126. These cases have been repeatedly cited and approved in a long line of decisions down to the present date.

But more especially has the Supreme Court condemned re-issues that were taken for matters disclaimed or abandoned in the original application. In Union Cartridge Company *vs.* Cartridge Company, 112 U. S., 624, the Court remarked that an acquiescence and disclaimer, on a decision requiring the disclaimer as a condition precedent to the grant, not only barred a suit for the thing disclaimed, but prevented a subsequent re-issue to obtain what was so disclaimed. In Leggett *vs.* Avery, *supra*, which was cited and approved in above last cited case, the following very broad language was used: "We consider it extremely doubtful whether re-issued letters patent can be sustained in any case where they contain claims that

have once been formally disclaimed by the patentee, or rejected with his acquiescence, and he has consented to such rejection in order to obtain his letters patent. Under such circumstances, the rejection of the claim can in no just sense be regarded as a matter of inadvertence or mistake. Even though it was such, the applicant should seem to be estopped from setting it up on an application for a re-issue." And in numerous subsequent decisions, involving the validity of re-issue claims for matter rejected or disclaimed in the original application, the Circuit Courts have accepted the doctrine of estoppel as absolutely barring the grant of a re-issue therefor. For example, see Atwater Company *vs.* Beecher Company, 8 Fed. Rep., 608; Putnam *vs.* Hutchinson, 12 Fed. Rep., 187; Edgarton *vs.* Manufacturing Company, 9 Fed. Rep., 450; and this notwithstanding that it afterwards appeared that he was the inventor of the disclaimed device. Street *vs.* Lanter, 11 Fed. Rep., 309.

To meet the force of these decisions the plaintiffs seek to show that the patentee, Greaves, did not acquiesce in the decision of the Board of Examiners-in-Chief, rejecting his claim to the matter subsequently patented to him by the re-issue in suit, and that his solicitor, without his knowlege, (though presumably not without knowledge of the various adverse decisions), filed the disclaimer required, first, by the Board, and afterwards by the Commissioner, as a condition precedent to the grant. If this were true it would not alter the case, for the very simple reason that the solicitor did no more than the applicant himself would have been obliged to do, as a condition precedent not only to the allowance but to the dissolution of the interference. The applicant cannot treat as an inadvertence or mistake the deliberate act of his attorney,

in the line of his express authority under the power, in withdrawing a claim which the Patent Office authorities had repeatedly, after numerous examinations and appeals, rejected, and which the final decision of the Board of Appeals had required to be erased, and which the Commissioner, two months afterwards, in the interference proceeding subsequent to that decision of the Board, required to be still further circumscribed and limited. From the language used by the Board of Appeals in their decision (see Record, pp. 87 and 88), it is easy to see how the applicant argued that appeal in order to obtain the reversal of the Examiner, and even then only obtained an allowance conditioned upon filing a disclaimer to the identical thing now here claimed in this division of the reissue. His two deliberate disclaimers of this matter, partly in compliance with the ruling of the Board, and afterwards on his subsequent motion to dissolve the afterwards-declared interference, on the ground *inter alia*, that his invention did not cover the only thing found in his opponent's application common to both (see folio 166, page 90 of Record, being the Examiner's comments thereon), is, of itself and standing alone, an absolute bar and estoppel from afterwards claiming this thing which he thus disclaimed in order to obtain the Commissioner's order of February 9, 1877 (see Record, bottom of page 90), dissolving the interference. To say that these deliberate acts, by which certain decisions, acts, and orders of the Patent Office were intentionally obtained, spreading over a period of two months, were without the knowledge or acquiescence of the applicant, and the unauthorized acts of the solicitor, and hence constitute, and are, accidents, inadvertences and mistakes, within the meaning of the statute authorizing reissues, is, as remarked by the Supreme Court in Leggett *vs.* Avery, *supra*, "too bald for consideration."

It is claimed in appellant's brief that the patentee should be relieved, because the solicitor "by *mistake* omitted a claim which the inventor was *entitled* to have," and that he did this "under a *mistake* as to his principal's *rights*." Whatever might be the law, if the facts were as alleged, the Record clearly shows not only that the patentee was not *entitled* to have this claim, but that its withdrawal, was not by mistake, but intentional, and in compliance with the decision of the office, in an adjudication of the inventors so called *rights*. Ives *vs.* Sargent, 119 U. S., 652, is cited to show that the patentee should be relieved from the effect of the solicitors negligence, and of his error in drafting or omitting a claim. But in the case at bar the solicitor was not negligent, nor did he make any error.

The case of Boland *vs.* Thompson, decided by Judge Coxe, in Southern District of New York, 26 Fed. Rep., 684, contains facts very similar to the present. There the patentee was a foreigner, and ignorant of the English language; and the act of the solicitor (without the knowledge of the applicant), in amending the original application by withdrawing a rejected claim, which was afterwards incorporated into the reissue, was attempted to be called an accident or mistake, for which the applicant was not to be held responsible, but the Court reviewing the cases hereinabove cited and others, refused to recognize such a proposition as sound, and held the reissue void.

It is claimed by appellants that the decisions in Leggett *vs.* Avery and Cartridge Co. *vs.* Cartridge Co. were based on disclaimers filed after issue of original patent, and in pursuance of Sec. 4917, Rev. Stat.; but there is no legal distinction, as respects the doctrine of estoppel, between disclaimers filed

under the statute, and equally formal disclaimers filed pending the application for the patent instead of after its issue.

III. *Invalidity of the original patent by reason of more than two years public use of the thing now claimed before filing of the amended description and claim covering it.*

There is still a further and fatal objection to this claim, even though it appeared in the *original* patent instead of in a re-issue thereof. The appellants brief inaccurately treats it as claiming a *forfeiture;* perhaps it is in law; but, in fact, the defence rests on the ground that the patentee *never was* entitled to that part of the thing now claimed; as he took what was old and worked it into his original application by amendment, new drawing and new model, over two years after filing the original papers, and nearly three years after defendants had adopted it in their mills. The record shows, beyond question or dispute (see page 34, folio 62, and page 38, folio 68), that the square shaft in question (irrespective of material), has been in use by the defendants in their carding engines, at their mills, continuously, since May or June, 1872, more than ten years before suit brought; more than nine years before the re-issue was granted; and five years before it was applied for; and over four years before the original patent was granted, and several months before it was even applied for. It may be true, and probably is, that Greaves had applied it—in cast-iron—even before that, and these facts are not cited as proof of want of novelty, but they are cited to show, in connection with the record of this application, that the *form* of the shaft [irrespective of the *material* of which it was composed], formed no part

of Greaves' alleged invention; that he never at first thought it did; and that it was purely an afterthought, worked into the case by an amended description, a new claim, a new drawing, a new model, and a new oath, nearly three years after the filing of the original application, and after the square shaft in carding engines had long been in use by these defendants and others. He *never* had any right to the *form* of the shaft. The Board so told him (see Record, page 88); the Commissioner so told him in the original decision (see Record, page 85), and even his counsel admits (see page 18 of his brief) that the "broad combination of a polygonal shaft with a polygonal bearing was, therefore, not new with Greaves, as it was *per se*, a known mechanical device," but new only "in its combination with a carding engine." As shown, this did not produce any *new* result, but only in degree, as the Commissioner remarks (see Record, page 85).

In proof of the facts first above set forth, let us look at the Record (page 83), showing that the application was filed September 30, 1872. The original or first specification (printed on page 62), described the invention as consisting of a new material as applied to shafts for this purpose, and claimed "the application described, of cast-iron spindles to the condensing cylinders of carding engines," *and nothing else*. Not a claim for the *shape* of the shaft and its bearing-hub, and not a word in the specification about the shape, except this: "*it is not essential that the spindle, when it passes through the wheel, should in all cases be round; it may, for instance, be square,—in which case the feather may be dispensed with*," and this statement is not a *description* of what is *now* alleged to be the invention as claimed by the appellants in their brief, but nothing more than what was then well known in the art, and

Be it so, however, the lapse of two and a half years between the filing of the original application and the time this claim was first made therein (the square shaft having all that time been in use by these defendants and others), is a bar to any valid patent for it, either in an original or a reissue. This Court has so settled the law, in Railway Company *vs.* Sayles, 97 U. S., 555, wherein Mr. Justice Bradley, delivering the opinion, says: "It will be observed that we have given particular attention to the original application, drawings, and models filed in the Patent Office. * * * We have deemed it proper to do this, because, if the amended application and model, filed * * * five years later, embodied any material addition to, or variance from, the original—anything new that was not comprised in that—such addition or variance cannot be sustained in the original application. The law does not permit such enlargements of an original specification which would interfere with other inventors who have entered the field in the meantime, any more than it does in the case of reissues of patents previously granted. Courts should regard with jealousy and disfavor any attempts to enlarge the scope of an application once filed, or of a patent once granted, the effect of which would be to enable the patentee to appropriate other inventions made prior to such alteration, or to appropriate that which has, in the meantime, gone into public use,"

Attempt is made by counsel for appellants to distinguish between this case and that at bar, by the statement in the brief, that "in Greaves' case there is no question, but that the invention was comprised in the original application." On the contrary this conclusion of fact is very seriously questioned, as already set forth in the preceding pages of the argument, under this branch of the case.

IV. *The want of power in the Commissioner to issue divisional re-issues at different dates.*

There are other defences set up in the Answer—one, arising under the grant of a patent in 1874 to the same patentee, showing and incidentally describing, but not claiming, a square shaft. [See Defendant's Exhibit 13, Greaves' Patent of June 30, 1874; Record, page 122. The other, a much disputed question of law as to the power of the Commissioner, under the Revised Statutes, to issue divisional re-issues at different dates. It is quite true as stated by counsel for appellants, that the Assistant Attorney General for the Department of the Interior did pass such an opinion, favorable to the appellants contention, but cited no authority, and is certainly not to be treated as *res judicata*, and, from its reasoning, is hardly persuasive of the correctness of the conclusion reached. Prior to the Act of 1870, under which this Patent issued, original patents surrendered for re-issue were cancelled from the date of surrender, but under that statute they continued in force, after surrender to the office and, *until the dating and issuing of the re-issued patent.* See Sec. 4,916 Rev. Stat. The same section authorizes the Commissioner to re-issue the patent in divisions, for any separable parts of the invention, if so requested by the applicant. It is manifest, that if the original patent is to remain in force until the new patent or patents issue, that the issue of one division (unless the other division issues simultaneously with it) exhausts the power of the Commissioner in the premises; otherwise there would be two patents for parts of the same thing (an original and one divisional re-issue thereof) in force at the same time; which is a fatal incongruity. On the other hand, if the issue of one division has the effect to cancel the original (and it cannot be